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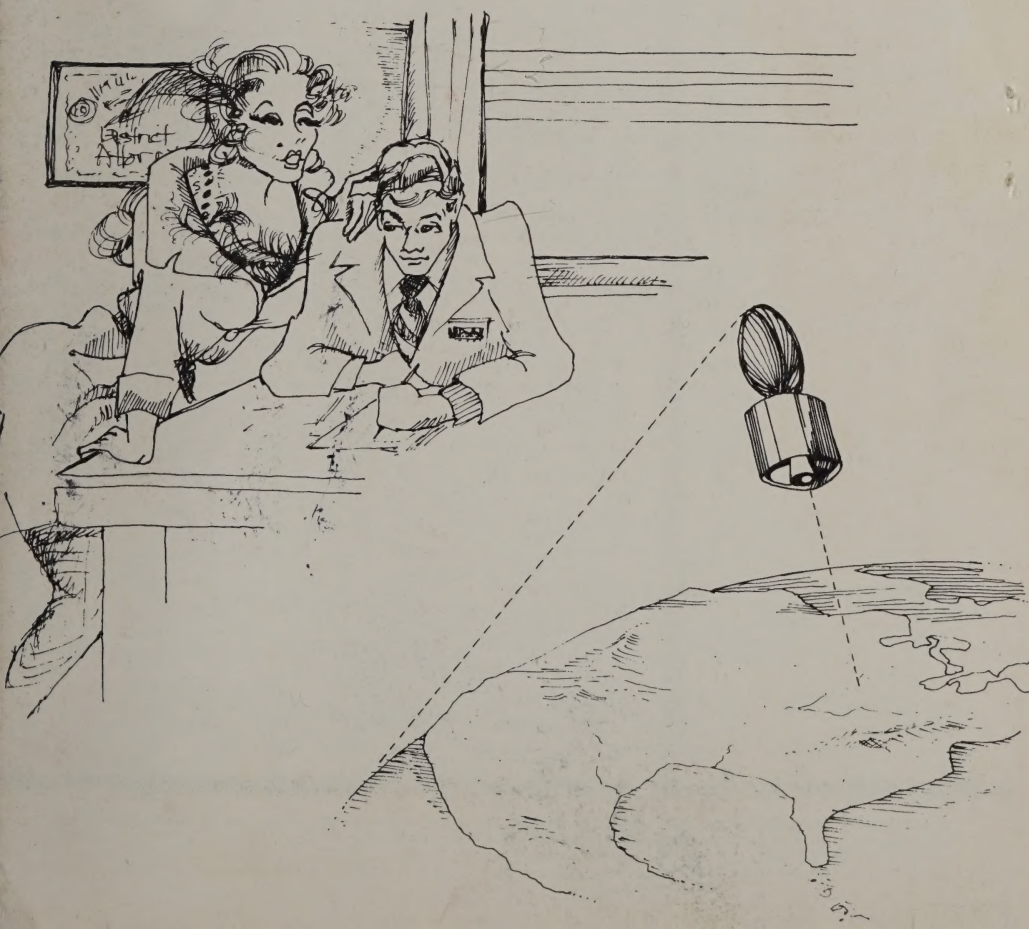
MAY/JUNE
1975
AMATEUR TELEVISION
MAGAZINE

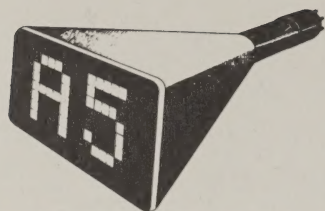
Vol. 5

Number 3

THE STRIPPER AND THE DA
FOCUS ON SSTV

BUILD A VIDEO CHARACTER GENERATOR
SATELLITE FAX PIX RECEIVER





Amateur Television Magazine

MAY-JUNE 1975

VOL. 5

NO. 3

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SINAD: THE PROFESSIONAL WAY TO MEASURE RECEIVER SENSITIVITY

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March 1975 issue of
COMMUNICATIONS magazine
Englewood, Colorado
Part I of two parts

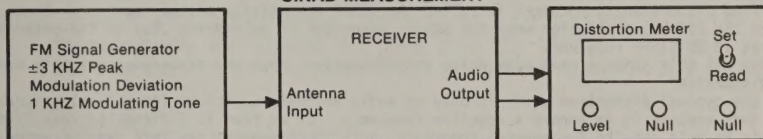
If insufficient range appears to be the problem with your radio system, expensive transmitter repairs may not be necessary. The sensitivity shortcoming of the receiver can be corrected, as Robert Stanley, owner of a radio business since 1956 explains.

by: Robert W. Stanley, Stanley Commercial Radio, Greeley, Colo.

Good receiver performance often fails to get proper attention when a technician is faced with insufficient range in a radio system. A lot of time and parts are often wasted repairing a 60 watt transmitter that only delivers 50 watts, while a receiver that only supplies a sensitivity of .5uV, when it is rated at .35uV, is ignored. The drop in transmitter power is only a degradation of .8db-hardly noticeable in the real world, but the lack of receiver sensitivity amounts to a degradation of 3db. In a system not limited by a noisy receiver location, this 3 db at the receiver could be equaled to having our 50 watt transmitter delivering only 25 watts. While the repairs on the transmitter are likely to run into some expensive output transistors, the sensitivity shortcoming of the receiver can often be cured with a little alignment touch up.

Part of this neglect of the receiver is based upon the fact that the power output of the transmitter can be quickly, and unambiguously, measured with a simple wattmeter, while receiver sensitivity measurements require more time and equipment.

SINAD MEASUREMENT*



1. Set Signal Generator precisely on channel frequency.
2. Insert strong signal into receiver, and adjust receiver volume to normal output.
3. Switch Distortion Meter to SET, and adjust level control for 100% scale reading.
4. Switch Distortion Meter to READ, and adjust Null controls for minimum scale reading.
5. Decrease signal generator output until Distortion Meter reads 25%.
6. Momentarily switch back to SET, and if necessary readjust level control to 100%.
7. Switch back to READ, and adjust signal generator output to obtain the 25% scale reading.
8. Signal Generator output calibration is the 12 DB SINAD sensitivity of the receiver.

*This is a simplified procedure for service shops. To obtain SINAD according to EIA specifications, receiver audio output must be adjusted to the receiver's rated audio output power.

Ask several technicians how they measure the sensitivity of a receiver, and you are likely to get a lot of hazy answers. Because of the rush to get the job out, many do it by ear-some have worked up a little procedure involving squelch opening, and a few make a 20 db silencing measurement. All of these methods are subject to wide interpretive errors and fall short of telling the technician what he needs to know; is this receiver performing as well as it should?

Stanley Commercial Radio has a number of customers that roam the wide open spaces of NE Colorado. They need the ultimate range that their radio systems can give them-and some could use more range if they could get it economically. In order to give these customers the type of maintenance service they need, we have found that it pays to give the receiver end of the radio circuit its proper attention. In order to know whether the receiver needs any work, and to know when to restore it to its rated capacity, we need to measure its sensitivity. We do the measurement by the SINAD method, the method used by the designers and manufacturers of the equipment.

SILENCING METHOD UNTRUTHFUL

In the early days of land mobile radio, the sensitivity of these new-fangled FM receivers was measured by the 20 DB silencing method; an audio voltmeter was placed across the receiver audio output, the squelch circuit was disabled, and the resulting noise was measured on the voltmeter. Then, an unmodulated signal was pumped into the antenna jack, and increased in level until the voltmeter showed that the noise had been reduced (quieted) by 20 DB-a voltage factor of 10. Since an FM signal generator was somewhat of a rarity, this method of measurement was as good as most shops could perform. Unfortunately the 20 DB silencing method fails to tell the whole truth about whether or not the receiver is doing its thing! It is possible to mis-align the IF strip in some sets to get such fantastic sensitivity measurements as .1 or .2uV at 20 DB silencing, yet be unable to understand a word of a received signal.

OBSERVING RECEIVER PERFORMANCE

In order to properly determine the performance of an FM receiver, it seems logical that we should observe how it performs while actually receiving a frequency modulated signal. That is what the SINAD system of measurement is all about. The manufacturers and designers of the equipment started using SINAD long ago, but many service shops couldn't follow because they didn't have accurately calibrated FM signal generators.

CONTINUED.....

SINAD: THE PROFESSIONAL WAY TO MEASURE RECEIVER SENSITIVITY (continued)

Now that any properly equipped shop has signal generators and FM monitors capable of delivering accurately calibrated FM signal, there is little excuse for not measuring receiver sensitivity scientifically and accurately. The additional equipment needed has a trifling price tag when compared to an FM monitor or signal generator, and the extra time needed for the measurement is small compared with trial and error methods of solving a coverage problem.

SINAD stands for Signal Plus Noise and Distortion. The method of measuring SINAD performance is spelled out in an industry standard, published by the Electronic Industries Association. This method is considered standard throughout the land mobile industry, and the manufacturers specifications sheets for almost all land mobile equipment give the manufacturers sensitivity claims as measured by the SINAD method.

MAKING THE MEASUREMENT

This is the way that the measurement is made: An FM signal generator properly set to the channel frequency, is modulated by a 1000 HZ sine wave. The modulation deviation is set to 60% of the normal peak modulation deviation of the system. (IE: 3KHz in typical 5 KHz peak deviation land mobile systems) This signal is fed into the receiver antenna jack. The receiver volume control is then set to produce the rated audio output power from the receiver, and a distortion meter is connected across the receiver audio output terminals. The distortion meter is then set to null properly at 1000Hz and the input level set control is adjusted according to a full scale reading. The meter is then switched to read distortion and the signal level from the signal generator is adjusted until the distortion meter reads some specified distortion percentage. The most commonly used value is 12 DB, or 25% distortion on the meter scale. The signal level (measured in microvolts from the output level calibration of the signal generator), at which the specified distortion is obtained is called the SINAD sensitivity of the receiver. Thus, if our receiver has 25% (12 DB) distortion when the signal generator is delivering .5uV to the antenna jack we have a .5uV at 12 DB SINAD receiver.

Ok, so whats all this about signal plus noise and distortion, when the distortion meter is made for measuring distortion?

Actually, the typical distortion meter is only an audio voltmeter, with an input level control, and a null circuit that enables it to ignore a specific frequency. If we feed it a distorted tone, then set the null controls to null out its fundamental frequency, only the harmonics are left and the meter measures their amplitude. When used in SINAD measurements, however, we are also concerned with the noise components coming out of the receiver and the distortion meter will also measure these right along with the harmonics.

The distortion meter has a function switch that switches out the null controls, and permits the operator to set the "level" control for 100% reading on the voltmeter scale. At this point, the voltmeters 100% indication is caused by the combined 1000Hz signal, noise, and harmonics of the 1000Hz. Then the null circuit is switched in, the null controls are adjusted to eliminate the 1000Hz signal tone, and the meter reads what is left, namely noise and distortion. The meter scale is usually calibrated in percent, and we have only to read off the percent indication from the meter scale. Thus, the distortion meter is really telling us this.

$$\text{METER READING (PERCENT)} = \frac{\text{NOISE AND DISTORTION}}{\text{SIGNAL PLUS NOISE AND DISTORTION}} \times 100$$

Distortion meters are usually calibrated in "percent distortion", but SINAD measurements are handier when expressed in DB. A 12 DB SINAD is indicated by the 25% reading on the percent scale and a 20 DB SINAD is indicated by the 10% reading.

The "noise" part of all this is the thermal noise that you hear in the background of the receiver when a weak signal is heard. The "distortion" part is harmonic distortion of the 1000Hz signal--most of which is created when we run the output audio amplifier at full tilt. The service technician worrying about receiver sensitivity usually doesn't need to be concerned about the distortion part of the problem. Unless the audio output stages are really "sour". Thus, it isn't really necessary to run the radio at full rated output to get a meaningful SINAD measurement. For service measurement, it is quite acceptable to turn the audio at a comfortable level during the test, and make a short listening test for unacceptable distortion at high volume levels.

Figure I gives a short, graphic illustration of the SINAD procedure, abbreviated to meet the needs of the service shop. (see channel 3)

ALIGNING THE RECEIVER

Once you have made the setup to measure the SINAD, don't fail to use it as a valuable assist in alignment of the receiver. Receiver manufacturers usually give alignment procedure based upon making the various adjustments to obtain maximum limiter readings in the receiver. After doing the alignment "by the book" try touching up the adjustments in the front end by tweaking for a minimum on the distortion meter, while receiving at the 12 DB SINAD level. An improvement of receiver sensitivity of 3 to 6 DB can often be obtained! If good judgement is used, a receiver can often be touched up enough to bring it to proper performance without digging out the manufacturers alignment procedure. Since the right book never seems to be at hand, this alone can make the SINAD a time saving tool. The truly professional service shop should assure the quality of its work by checking receiver sensitivity by the SINAD method. The extra equipment needed is minimal, and the measurement can be done in a few minutes with a little knob twiddling. Benefits are derived from the improved and quicker alignment and from the knowledge that sets leaving the shop are really operating properly.

P.C. ELECTRONICS

MAY 75 CATALOG OF PC BOARDS AND MODULES FOR YOUR COMMUNICATIONS SYSTEM

PREAMPS

PC Wired &
Board Tested

2 METERS..RF-146-1..Better than 20 db gain, less
than 2.5 db noise fig. dual gate FET..12 vdc
@ 5ma..120-170 mhz..2x2x1½ metal can..... 19.50

400 - 500 MHZ..RF-435-2..."The snow remover" brings
ATV pictures and FM out of the noise!! 23 DB
gain 2.5 db NF typ. See Chapt 3 Spec. Comm.
Tech. (ARRL 3.00) for circuit, etc. 9 vdc @
2 ma....2x2x1½ metal can..50 ohms in/out..... 19.50

VIDEO MODULATORS

ATV modulator for FM surplus rigs using dual tet-
rode finals--5894, 6907, 6524 in RCA CMUE-15s
etc. high resolution...5mhz, to pass color
and FM sound subcarrier. DC restoration
for max power on sync tips...model VM-1..... 3.00 15.00

HIGH POWER ATV MODULATOR for 4X150 and 4X250
tubes such as found in the apr 72 QST.
DC restoration & 5 mhz BW..105vdc @ 25ma..... 3.50 19.50

ATV ASSESSORIES

ATV AUDIO SUBCARRIER GEN..put 4.5 mhz fm sound
on the carrier with the video like regular
broadcast tv does..12v @ 25ma high Z mic
input...model FMA5...mount at xmtr..... 4.00 24.50

ATV TEST GEN..provides a few milliwatts of RF
in the 420-450 mhz to tune up a UHF tuner,
preamp, or local monitoring from ur camera. TVG-1
transistor modulated osc. hi resolution.9v... 3.00 11.50

VIDEO CALL IDENTIFIER..your call or any 6 letter
or number combo superimposed on the camera
video. Great for repeaters. connects in
video coax line, no other connections. req
5 vdc reg. @ 200 ma. controls for position,
in/out and white/ black. ext 3.58 mhz can
be added for color...model VID-1..... 9.00 79.00
Extra programed ROM..12.00

EIA SYNC GEN..model SG-3 provides all the timing
signals required for broadcast quality 2:1
interlace black/white or color with your
camera. Contains video mixer to add the sync
to your video before transmission. Drives
up to 3 cameras in special effects systems
interlace improves vertical resolution.
Crystal reference with 3.58 color carrier
and keyed burst...+5 v and -12v..... 8.00 99.00

ALL ITEMS POSTAGE PAID US..Many modules appear in new Specialized
Communications Techniques book (ARRL \$3.00)..Include sase with any
ATV questions..25¢ for schematics only.. ALL ORDERS CHECK OR MONEY
ORDER..NO CODs..Allow 3 weeks delivery...73 Tom W6ORG
2522 South Paxson Lane ARCADIA CA 91006

THE STRIPPER and THE DA

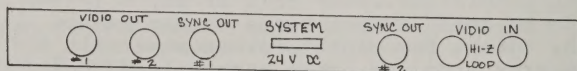
Often times, when using more elaborate set ups, with multiple camera, video recorders, special effects and other items, it's desirable to have a single source for sync pulses, or to be able to reference to an incoming signal sync. Often, for special effects, it is necessary to provide separate sync drive to the effects generator from the source video. The circuit shown below is of special interest to those of you who have this need. In addition, the circuit will also provide two video outputs which can be used to drive an input of a switcher, effects generator, VTR or other monitoring and signal conditioning equipment.

If you like, you can build one half or the other half, depending on your needs. The circuit is very non-critical, but a good ground should be provided to prevent cross talk between outputs and sync lines. The entire circuit needs about a 4" by 7" circuit board for an open layout, and can be condensed to a much smaller size if size is a consideration. I built mine in a 1 3/4" high rack panel bathtub chassis, with test points and controls on the front, and input/output jacks on the back. Power consumption is very small, and almost any "dime store" 24 V transformer can be used. The zener is used for voltage regulation (important) and to provide protection for the devices. The transistors are cheap generic types, and many other types can be substituted from the junk box. Frequency response is greater than 5 MHz, so it is fine for color. Various controls for frequency and gain are incorporated to make the unit adjustable for almost any application. If you are lucky enough to own a quad VTR, such as an AMPEX VRI000, the unit can be used directly out of the demod to drive the servos and provide a demod video output signal with out the need of a separate proc amp.

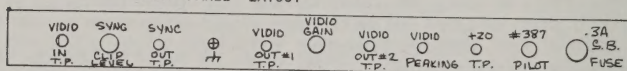
The frequency peaking controls are provided to allow you to flatten out your system frequency response, or tailor it to your needs. However, the unit does have the capability of over peaking high frequencies to the point of oscillation, and the adjustment should be made with the knowledge of what it is really doing in your application.

If you need additional outputs, you can add them in parallel to those provided up to a total of four outputs for each, video and sync. If you are building a video RPT, this circuit is very useful as a SOR (sync operated relay) by simply adding a filter and RC time constant to drive a relay (reed type) or transistor switch with detected incoming sync. No sync, no COR action! Handy! This will keep gremlins from carrier only key ups of your VIDEO repeater. HA! Fooled you mic kerchunkers again! Run the video from the receiver output to the STRIPPER/DA input. Use one sync output for the SOR, one for the special effects (video ID's) drive, one video out for local monitor and one video output for transmitter input. Everything in one package. Add your W6ORG video ID's (or other unit) to your receiver/transmitter and you're in business!

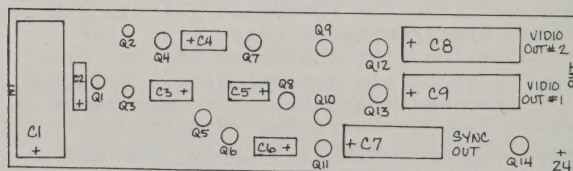
While the unit is a little overbuilt, the additional circuitry is added to provide better signal conditioning and control, as well as better frequency response and better s/n ratio than could be achieved using less amplifier stages. I'm sure someone will be enterprising enough to build an IC version before long. I'm sure some of the current IC's lend themselves to this type of application very well. For those of us in the dark ages of transistors, it works well enough.



BACK PANEL LAYOUT



FRONT PANEL LAYOUT

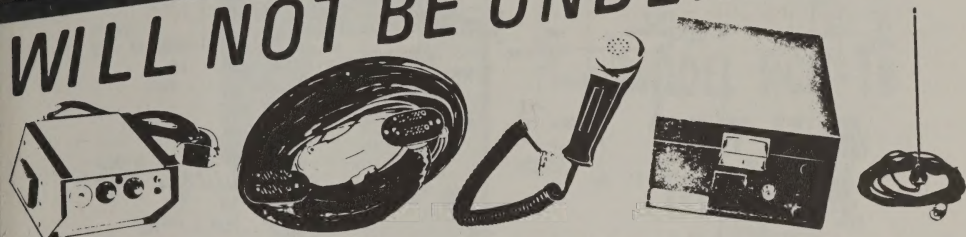


P. C. BOARD LAYOUT

(CONTINUED ON CHANNEL 8)
A-5 MAGAZINE

DuPage FM

WILL NOT BE UNDERSOLD!



RCA CMUE-15 18 watt 450 TRANSCEIVER. 12V DC mobile complete with all accessories except antenna.

BEST ATV COMMERCIAL CONVERSION UNIT...ACCEPTS ALL POPULAR
ATV VIDEO MODULATORS NOW ONLY \$50!

DU PAGE FM Inc.

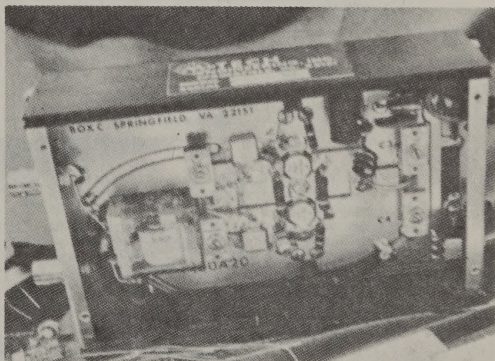
P. O. Box 1, Lombard IL 60148, (312) 627-3540

TERMS: All items sold as is. If not as represented return for exchange or refund (our option) shipping charged prepaid within 5 days of receipt. Illinois residents must add 5% sales tax. Personal checks must clear before shipment. All items sent shipping charges collect unless otherwise agreed. Accessories do not include crystals, relay or antennas.



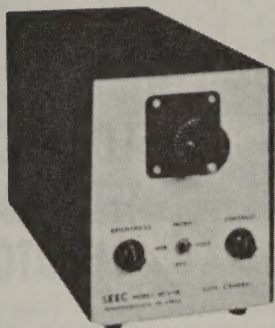
QUALITY

Model	Power In	Power Out
15A1	1 - 5 W	12 - 25 W
50A10	1 - 18 W	12 - 60 W
100A10	2 - 12 W	50 - 110 W
100A20	18 - 30 W	80 - 110W



One Year Factory Warranty

**M-TECH ENGINEERING BOX C SPRINGFIELD, VIRGINIA 22151
(703) 354-0573**



MODEL HCV-1B SLOW SCAN TELEVISION CAMERA

The SEEC Model HCV-1B Slow Scan Television Camera provides a means of transmitting live pictures, printed material, etc. By use of Amateur Radio, short wave radio, telephone lines, etc., these pictures may be transmitted around the world. With the use of ordinary room lighting, the camera will transmit clear, sharp pictures without a lot of critical adjustments. Camera may be operated on a tripod indoors or out. Features include built-in

AC power supply, plug-in glass epoxy-gold plated P. C. board with transistors and I. C.'s mounted in plug-in sockets, digital timing circuit, vidicon camera tube (Industrial grade), completely solid-state (except for vidicon), simple connections to existing equipment. Built to industrial specifications to give long trouble free service.

Specifications

PICTURE SCAN

Size: 3/8 by 3/8 inch (vidicon face)

Lines: 120-128

Line rate: 15 Hz

Frame rate: 8 seconds

Deflection: Magnetic

Focus: Magnetic

LENS

Type: 25 mm, f/9 (supplied)

Stops: f/9 to f/22

Focus: 14" to infinity

FRONT PANEL CONTROLS

Contrast: Vidicon target voltage

Brightness: Video bias level

Normal-Reverse: Reverse horizontal sweep (mirror image)

REAR PANEL CONTROLS

Output level: Video output attenuator

Beam: Vidicon beam current

Positive/Negative color reversal

Frame selector: 1/4-1/2-3/4 frame rates

SSTV transmit/standby switch

F. S. Set-up-SS operate switch

Power on/off switch

Circuit Breaker

Power Indicator

REAR PANEL CONNECTORS

SSTV video out: 1/4" phone jack 0 to 3 volts P.P.

FSTV video out: BNC-1.0 V. P. P.

FSTV R. F. out: SO-239-150 MV PP

VIDEO OUTPUT

Modulation: FM

White: 2300 Hz

Black: 1500 Hz

Sync: 1200 Hz

Amplitude: 0 to 1 volts peak-to-peak, adjustable

Output impedance: 1 K

Sync:

Horizontal: 5 milliseconds

Vertical: 30 milliseconds

Spectrum: Meets published Bell System tariffs for connections to voice couplers.

General Note: Printed circuit board exchange program and complete service and technical facilities available if needed. Engineering changes and improvements sent out to customers when they are made. Standard 1 year warranty on all parts (transistors, diodes, I.C.'s) and workmanship; 90 day warranty on vidicon tube

FAST SCAN OUTPUT

Video:

Modulation: Baseband AM. 20 Hz to 350 KHz

Amplitude: 1 volt

Impedance: 1 K OHMS

Polarity: Black positive going

Sweep (with FS switch in Set-Up/Operation Switch in

Set-Up position)

Horizontal 5 KHz

Vertical 35 Hz

PROVISIONS FOR ALC (Automatic Light Control)

POWER INPUT

Voltages: 115V 50/60 Hz or 230 V 50/60 Hz

MECHANICAL

Width: 6 in.

Height: 8 in.

Depth: 14 in.

Weight: 12 lbs.

Cable length: 8' AC line cord, 12 ft (Supplied FM Video)

CONSTRUCTION

Circuit board: Glass epoxy; plug-in-gold plated

Cabinet: Aluminum

Lens: C-mount

Tripod fitting: 1/4-20

Color: Black and White (or optional 2-tone gray)

COMPONENT COMPLEMENT

Transistors: 48

IC's: 14

Diodes: 26

Tubes: (vidicon) 1 - 7735A Industrial Grade

RF OUTPUT-(HCV-1B ONLY-OPTIONAL ON HCV-1C)

Unique focusing aid allows picture to be viewed on standard TV

set. Channels 2-6. Note: Although this is the fast scan RF

output, it should not be confused with standard 500-600-line

Fast Scan. This is at 120 line resolution, which is adequate for

focus adjustment on a fast scan TV set or monitor, provided

horizontal frequency is adjusted to camera frequency.

OPTION-GRAY SCALE GENERATOR

All Prices and Specifications are subject to change at our option.

PRICE: See Price List. F.O.B. Hendersonville, Tenn.

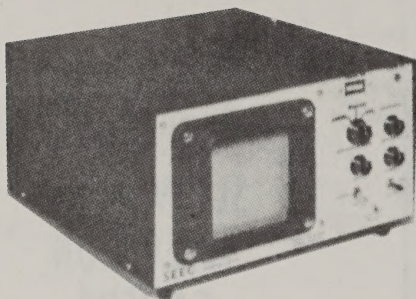
SUMNER ELECTRONICS AND ENG., CO., INC.

P.O. BOX 572

138-B Nauta Line Drive

HENDERSONVILLE, TENNESSEE 37075

TELEPHONE: 615-824-3235-24 Hours



MODEL HCV-2A SLOW SCAN TELEVISION MONITOR

The SEEC model HCV-2A Slow Scan Television Monitor demodulates and displays pictures transmitted by the HCV-1B camera or other similar cameras, video signals (SSTV) received on an amateur radio receiver, short wave receiver or from telephone lines, from around the world. The HCV-2A contains all necessary switching and inter-connections required to integrate SSTV reception and transmission (if a camera or tape recorder are existing) into existing equipment. Features include removable CRT filter for greater viewing flexibility, plug-in gold

plated glass epoxy P. C. Board with transistors and I. C.'s installed in plug-in sockets, complete solid-state construction (except for CRT), automatic SYNC, balanced discriminator, simple connections to existing equipment. Monitor shipped with neutral density filter installed, which provides black & white pictures, rather than yellow. Picture color is a result of both the filter, special CRT and phosphor mix, plus a higher more stable anode voltage. Built to industrial standards to give long trouble free service.

Specifications

PICTURE

Size: 6.25" in diagonal
Lines: 120 (approximate)
Line rate: 15 Hz
Frame rate: 8 seconds (approximate)
CRT: P-7 phosphor, (special mix); magnetic deflection; 10-14 KV (adjustable) anode voltage.

VIDEO INPUT

Modulation: FM, 1200 to 2300 Hz
White: 2300 Hz
Black: 1500 Hz
Sync: 1200 Hz
Amplitude: 20 millivolts to 10 volts
Input Impedance: 1 K OHMS
Sync:

Horizontal: 5 milliseconds
Vertical: 30 milliseconds
Signal-to-noise: 2 db min. (desired 4-5db)

FRONT PANEL CONTROLS

Brightness: CRT Brightness
Horizontal Hold: Line rate 15Hz + 5 Hz
Contrast: Video amplitude
Video Select: Input/Output Selector

Receiver-Camera-Tape

Video-Voice: Selector for transmission.

Manual vertical Trigger: To start vertical sweep over at any time.

On/Off power switch and indicator

Tuning Meter: To aid in tuning of SSTV signal.

REAR PANEL CONTROLS AND CONNECTORS

Microphone: Voice input

Transmitter: FM video or voice to transmitter

To Tape: FM video to audio tape recorder

From Tape: Playback from audio tape

Receiver: FM video from receiver

Telephone Line Input/Output

Focus: Picture tube focus

Camera Video Input

Aux. Video Out-For scope monitoring

Access holes for P.C. board calibration

POWER INPUT

Line voltage: 115 volts, 50/60 Hz or 230 V
50/60 Hz

Power: 30 watts

MECHANICAL

Width: 14 in.

Depth: 15 1/2 in.

Height: 8 1/2 in.

Weight: 25 pounds

CONSTRUCTION

Circuit Board: Glass epoxy plug-in-gold plated

Bezel: Aluminum

Cabinet: Aluminum

Color: Black and White (or optional 2-tone gray)

COMPONENT COMPLEMENT

Transistors: 30

IC's: 11

Diodes: 28

Tubes: 1 (CRT)

OPTIONS

Fast scan viewfinder to view real time pictures, at camera fast scan rate, on the same SSTV CRT. SSTV can also be transmitted while viewing fast scan. This is a very useful focus aid.

All Prices and Specifications are subject to change at our option.

PRICE: See Price List. F.O.B. Hendersonville, Tenn.

General Note: Printed circuit board exchange program and complete service and technical facilities available if needed. Engineering changes and improvements sent out to customers when they are made. Standard 1 year warranty on all parts (transistors, diodes, I.C.'s) and workmanship 90 day warranty on CRT (picture tube).

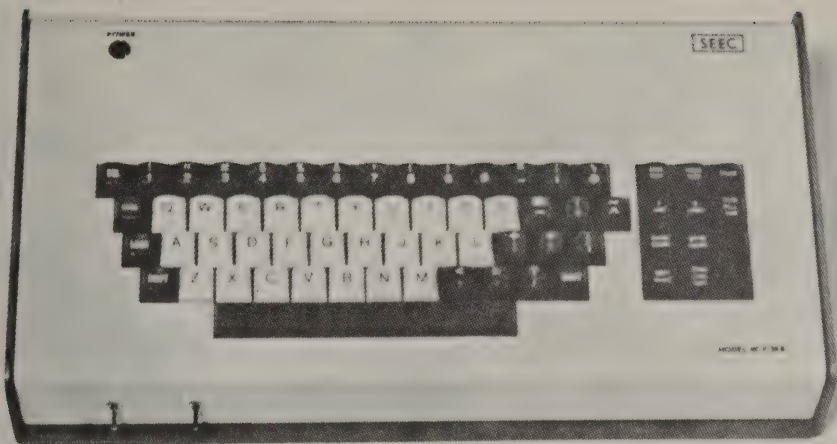
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HENDERSONVILLE, TENNESSEE 37075

TELEPHONE: 615-824-3235 - 24 Hours



SEEC (THOMAS) MODEL HCV-3KB SLOW SCAN TELEVISION (SSTV) KEYBOARD

The HCV-3KB Slow Scan TV Keyboard is a system whereby a keyboard is used to generate alphanumeric information at the proper SSTV frequency levels through a direct digital (TTL) process. This system eliminates the need for a "menu board" or other letter/number set-up arrangement which is very time consuming, etc., to set up a meaningful text on, by arranging the letters and numbers by hand. By using the keyboard the operator simply types out the message to be sent as one would on a typewriter. The use of the keyboard also "frees up" the SSTV camera from looking at a menu board, so that it may be used for live scenes of the operator or other subject matter. The keyboard also provides the necessary switching to switch from keyboard to camera and vice versa, when using the HCV-1B or similar camera. For other SSTV equipment (other than SEEC/HCV) an output is provided for inputting the keyboard into the Tape In on the SSTV monitor or direct to the transmitter mike jack.

The HCV-3KB meets all currently accepted SSTV standards and is therefore compatible with all SSTV equipment operating to these standards in the U.S. and Canada. The basic keyboard system consists of 9 main sections: Keyboard, memory, write clock, read clock, character generator, D/A converter, SSTV VCO, gray scale generator (4 shades—2300, 2100, 1900, 1700 Hz) and the power supply. All these sections are housed in a single cabinet, which allows for a neat, compact unit. A standard ASCII encoded keyboard is used.

SPECIFICATIONS

The HCV-3KB SSTV Keyboard will produce the following SSTV screen format, when properly encoded:

30 Characters Per SSTV Frame = 6 Characters Horizontally and 5 Characters (Lines) Vertically.

Other character formats will be made available in the form of modification kits to produce the following:

35 Characters Per SSTV Frame = 7 Characters Horizontally and 5 Characters (Lines) Vertically.

6 Characters Per SSTV Frame = 3 Characters Horizontally and 2 Characters (Lines) Vertically.

The standard SSTV frequencies used in the HCV-3KB are as follows:

Number of SSTV Lines: 120-128

Time Per Full Frame: 8.0-8.5 Sec.

Modulation: FM 1 Volt PP

White Frequency: 2300 Hz

Black Frequency: 1500 Hz

Sync Frequency: 1200 Hz

Sync Pulse (Duration):

Vertical: 30 ms.

Horizontal: 5 ms.

Reed Key Switches—Average Life 30 million operations.

SPECIAL FEATURES

Positive-Negative Video (Color) Background Reversal.

¼ & ½ Frame Rates—1 Line or 3 Lines.

4 Shade Gray Scale Generator—To Aid in Proper Monitor Set-Up.

Dual Fast and Slow Scan RF and Video Outputs—Optional Modification Kit to be Available later.

Keyboard-Camera or Aux SSTV Video INPUT Selector.

Sync Only Test Key.

Video Only Test Key.

Plug-In Printed Circuit Boards—G10 Glass-Epoxy-Gold Flashed Edge Connectors.

Plug-In Sockets for ICs, Op Amps, etc.

SSTV Video Level Control-Optional.

RF Protection Provided as in all SEEC (Thomas) equipment.

Power Input: 115V 60Hz/50Hz

Size: 4" x 8½" x 16½"

Weight: 10 lbs.

Construction: Aluminum Cabinet. Color: Black & White; 2 Tone Gray or Blue and White. Black & White is standard.

Standard 1 year warranty on all parts and workmanship.

U.S. Patent #DD-033469 as well as other Copyright numbers. All Rights reserved by SUMNER.

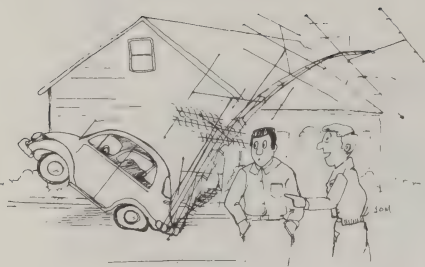
SUMNER ELECTRONICS AND ENG., CO., INC.

P.O. BOX 572

138-B Nauta Line Drive

HENDERSONVILLE, TENNESSEE 37075

TELEPHONE: 615-824-3235—24 Hours



EDITORIAL:

Henry B. Ruh WB8HEE

20282: an iceberg of subversive amateur radio regulations disguised as incentive licensing.

Hey George, How do you like my new set up!

operating privileges they have now, they will just sell out their stations and give up on ham radio. Incentive licensing does not work. We have had several years of incentive licensing now, and the bulk of extra class licensees are those who were grandfathered. To be sure there are "new" extra class tickets, but the proportion vs possible applicants is scant. The upgrading of a hams knowledge and expertise is not accomplished with examination. A person increases his knowledge in an area because of two reasons...1. he has to do it for economic or social reasons, which may lead to resentment, or.....he does it because its FUN, interesting, enjoyable. A lot of ham radio is accomplished because its FUN to do. As any hobby, we do not spend pots of money for ham radio equipment because we HAVE TO, we do it because of the recreational FUN, interesting accomplishments or relaxing pastime afforded us by the opportunity to experiment, build, communicate and converse with our fellow humans be they near or far away.

The incentive licensing proposal. unless there is a mountain of comments to the negative will no doubt be passed. We can, however, with a smaller mountain of comments prevent some serious disasters. ASK YOURSELF: Do we want or need a mass of COMMUNICATORS, who will have no ability except to press a mic and talk on FM after passing a novice type written exam? Isn't this why they took away the 2 meter phone privileges from the novice to begin with? Wasn't it because the FCC/ARRL discovered that the novice was talking instead of using CW on the lower bands, discovered the FUN of the VHF frequencies, and by and large moved into the technician class rather than the general class? Wasn't that why the technician and novice class were co-licensable? What more proof do we need? Now the FCC and perhaps the ARRL would like to develop the aspiring CB'er into a low class ham to be able to impress the WARC in 1979 with our tremendous growth. Bah humbug! They could accomplish the same thing by just declaring that 11 meters was now an official ham band again, and instantly there would be an increase of 1,200,000 "hams"! But for what reason would anybody want this many hams? Does it help or hinder the hams ability to communicate on say 2 meters if the present FM RPT system in most areas is already overcrowded, and you dump thousands more on 2 mtrs and up? Does it help or hinder the EIA manufacturers to sell or make money selling new "ham" appliances? Does it help or hinder the ARRL/Prose Walker general attitude that, if we turn loose a lot of beginners on the tech frequencies, we can then point a finger at the techs and say, after the chaos, "see, I told you the technicians were an unruly bunch and ought to be abolished!" Lets re-examine them all and see how many we can get rid of. I dare say that with all of the grandfathered extras, we could get rid of a lot of extras by re-examination too! Although I am sure that somewhere some active amateur was re-examined and lost his license, I for one do not know of a single technician who IS ACTIVE who was recalled for examination and failed. The answer is simple. If you are interested in HAM radio, you will be proficient in HAM radio. For no other reason that its a lot of FUN to get on the air and communicate with a lot of other people who have similar interests.

As an active ham, I know that unless the FCC produces a test which is not relevant to amateur rules and practices, that no matter what question they ask about HAM radio, as an ACTIVE ham, I know I would be able to pass the test. The key point is ACTIVE. We stay active in things we like, and we drop out of activities we do not like.

If we are interested in CW, we learn and become proficient in CW. If we like FM, we learn and become proficient in FM. If we like ATV, or RTTY or FAX, or SSTV or RADAR or any other area, we learn and become proficient in it.....BECAUSE WE WANT TO...ITS FUN...ITS INTERESTING ?????? We do not need an FCC test to become INTERESTED and thereby proficient in anything. So why the multitude of licenses????? Is this bureaucracy just sustaining itself? Are the rules committees being self perpetuated just for the sake of self perpetuation? WHY WHY WHY WHY WHY?

A POSSIBLE SOLUTION: Why not just two grades of license. NOVICE AND GENERAL. The novice class license would be similar to a combined NOVICE and TECHNICIAN with a 5WPM code test (international law requires the ability to send and receive CW for operation on frequencies below 144 Mhz) and a simple but comprehensive rules and practice written test. This would allow relatively easy entry into the ranks, and allow the new ham to explore both HF and VHF to find his areas of interest. GENERAL exam would be similar to the present GENERAL/ADVANCED test with a code test of 10-15 WPM, (by now if you want to work the HF frequencies, you would have become proficient in CW or SSB phone) and a more thorough theory and practice written exam. For by now, if you have an interest in what really goes on, you would have gathered a lot of information, directly and indirectly which is what makes you able to pass any test. This would give you all amateur privileges. NO MORE CRYSTAL PALACE ON TOP OF THE MARBLE PEDISTAL. Everybody equal. Your ability to operate or build would be more important than your ability to study a book for a test. Those with specialized interests would pursue those interests, without the shadow of having to take a test to actually operate in these modes. HAM RADIO IS AN EXPERIMENTAL AREA. LEST WE DESTROY IT, BAN 20282.



Henry,
I would much appreciate your consideration of whatever comments you may best be in a position to make with regards to my inquiries of interest.

My experience with such matters is nil, although have read all of the conversions articles for amateur fax operations. These have been quite informative all-around, have given some consideration on a project of this nature, the prices on Desk Fax 6500 and other models being rather attractive even when the tax and duty and shipment is added.

I am enclosing a copy on a satellite photograph receiving station (cost of \$2) which appears quite complete on all particulars, despite the rather simple conversions of fax transceiver.

(Editor: printed elsewhere)

Its being so much less than for the requirement in amateur fax operations, makes me wonder as to the overall efficiency of the system, the author no doubt knows his business as remainder of article is very well explained in all details. The choice of sync and phasing makes it handy for those less experienced for one, the economics additionally welcome. I truly cannot say just how effective this method would make out. I would like to see an example of this because I can only take his word for it.

The converter/preamplifier must be commercially available, the other magazines advertise a lot of gear at a decent price. The antenna can be either home constructed or purchased ready-to-go. I will need to inquire locally as to just what may be available at acceptable price, amateur radio operations so require outlets to stock a decent list of equipment.

I must inquire on the satellites daily schedule with all particulars to allow reception the Ottawa are receiving station should be my best bet, I think.

All information received will certainly be most welcome.--D, Arcy Brownrigg

A5,

Just received a sample and was impressed enough to subscribe...dumbfounded by explosion of 2 mtrs and state of the art. Have been a ham for 10 yrs. trying to get RTTY station on the air. Also interested in 2 meter and FSTV...live in mojave desert about 100 miles west of Death Valley.

Ron WB6GKI

To A-5 Magazine

Letter to the Editor

Good Ridence John Huntoon!

Regarding the Jan/Feb article on John Huntoon WIRW, the statement that he would like to get into ATV couldn't be farther from the truth than a Richard Nixon press conference. Huntoon has been directly responsible for editing out all articles and references concerning ATV repeaters. (That's why you have seen nothing on this subject in QST!) He is and has been anti-ATV throughout his tenure. This reluctance to accept advanced communications techniques has also been prevalent in other areas. Good ridence John Huntoon! Bruce WB4TYU

Dear Ron,

I already have a camera but need a transmitter in the 430 Mhz band. The article in QST describes a modified RCA Carafone, CMU-15. Do you know of anywhere in the states where I can get such an item as this so I can modify it or is there anywhere I can get a transmitter for ATV all made up for the 430 band? They just don't have items in this band at all in Canada. Bill VE3GFT

Henry,

It's great to see A5 alive again!... Right now my biggest need is some sort of receiving system. If you could run some articles on how to start a good station, not just the minimum, but a good step by step approach to getting on ATV...I have a CMU-15 on 455 but I'm curious as to which is the best way to receive ATV and the availability of the equipment to do it. I have yet to be able to find a Blonder Tongue converter to convert. How about building a converter. I'd like also to see some projects on master sync generators effects generators and switches. Greg

A-5

Now a slick job, hi! Vy FB and hope 10,000 subs come in. Charlie W4API

Comm, Ultd,

I am interested in a slow scan system of intermediate speed between commercial and ATV, closer to the latter. I am hoping to adapt equipment and was told A5 magazine would be a source of articles and ads.

Therefore, I am interested in back issue availability and a subscription and would appreciate hearing of this at your earliest convenience. W9EXT

Henry,

As of today I have not received my copy of A5. Pls send down another copy. Will you publish an article on a character generator? Please pass along in next issue my comments about ATV repeater in Florida. As of today still no answer on application. About 1 1/2 weeks ago I sent Wiley a letter. Tnx and I hope to see A5 soon.

Leon WA2RRG/WA4ZLW

Hwnry,

I have a Bell system ERCO 36I-TB transmitter. Do you know of anyone using one on ATV? Also would you have any suggestion as to what type modulator I should build? Dan WA1EYX

Gentlemen:

Enclosed is my subscription. Put me down for a year's worth by all means. A5 is positively incredible magazine.

Saturday April 12 was a wing ding day here...I.. Sold an unused beam for \$35. Both a T-44 and CMU-15 rig arrived from Oaklyn, N.J. Received a sample of A-5 with tuning charts for both rigs. And, just bought a B-T BTX-III converter and there on channel 41 of A5 is WB4JFI's article on simple conversion of same. YAHOO!

Carroll W3HVD

MORE LETTERS !!!!!

EDITOR: Received a lengthy letter from Steve Wheaton, no address, who is interested in combining LASER technology and techniques with lenses and video cameras to produce artistic effects. He would like to contact anyone who is experienced in either area for further discussion and development of the technique. Steve seems to be well experienced in either photography and lens but is not familiar with vidicons and other image transferring devices. He would like to meet someone who is, to develop new ideas. Anyone interested should write A5, and we will publish their address since we don't have Steve's.

EDITOR: Haven't got your copy of A5 and all your friends have? The cartoons below might be a good suggestion as to where the problem might be. IN ADDITION, A problem has cropped up. MANY, MANY, copies are returned to us POSTAGE DUE because you haven't advised us of your new ADDRESS when you change QTH! This costs us a lot! I0¢ to get the copy back with the new address as supplied by the post office. 10-40¢ to mail out a new copy, plus about 30¢ printing cost of the extra copy, plus 25¢ to change the mailing plate, plus all the TIME it takes to get it all DONE. PLEASE! When you move, remember to let us know so we can correct our mailing list so you can get A5 just as fast as everyone else.

DAYTON! BIGGEST, BEST, WORST, LARGEST, etc. All the superlatives you can think of would apply to the 1975 DAYTON HAMVENTION. It was apparent the first rays of light over Dayton, Saturday, that the splendid job the DARA was doing had its achilles heel, the flea market. At 6AM the flea market was full and it stranded several hundred fleas outside. We finally formed our own swap and shop area in the parking lot. The problem seems to have been two-fold, 1. The campers were allowed to park overnight in the flea market area, and in an area which completely surrounded the flea market area, which left no room for expansion. In addition, the campers which stayed in the flea area overnight, many of them did not sell from their motor coaches at all, and just occupied valuable space with their huge vehicles. I'm sure 200 more cars or trucks could have been put into the area had the campers been prohibited from the flea area. I would suggest that next year, the DARA committee not allow campers on the grounds at all! There is a KOA campground just down the road, and the space is needed for the HUGE crowd of fleas. This would also allow room for EXPANSION, of the flea market area as necessary when they underestimate the crowd as they did this year. If the camper owners wants to sell too, let him stand in line with everyone else at 6 AM to take his chances at finding a spot. It isn't fair to those who have to drive all Friday night, or to those who for any reason cannot pull up in a motorhome, to allow anyone prior access to the flea area. As it was, they (flea guards) started letting people in before the 6 AM published time. In addition, when the area was full, no one was willing to make a command decision as to where to put the hundreds of others still waiting in line. Sunday was much better, as there were several hundred less fleas and there was room for everybody. Oh well,... With over 12,000 people there are bound to be problems, but all in all it was a tremendous swap/convention.

Bruce Brown and the Metrovision group was there and presented an EXCELLENT ATV forum. They had technical difficulties with a borrowed audio tape recorder, but were able to ad-lib the audio portion of a half hour film about the WR4AAG ATV repeater very well. The file was produced by the metrovision group, and did a splendid job of explaining and showing the ATV repeater, its functions, and what you could do with ATV. In addition, there was a humorous story line associated with a short "silent" as to what it takes to get a ATV RPT license #1. Don Miller did a fine job as MC of FSTV/SSTV forum, and a technical paper with good illustrations was given on line conversion for SSTV/FSTV. If you missed the forum, you had a chance to see the real thing in the ATV booth, which was in the rink area where the commercial exhibits were last year. K8060 had his fast scan TV setup there on display, as well as a color SSTV set up, a color videotape display, and many other items.

A5 had a booth in the commercial area. I would like to thank all the readers who dropped by and commented on the new A5. Ron K3ZKO and AL W3AEH were on hand too, to help things along and answer questions. A good time was had by all. At the booth we had a video disc and ATV transmitter set and transmitting on 439.25 A/V, a singer camera with remote control zoom lens and a good supply of intermittent IIO Vac!

We certainly look forward to dayton next year!!!!!!!!!!!!!!



ACTION ITEMS

NEED WORKING RCA CMU-15 converted or unconverted
Dan Hayes WA4CPO 2433 Pineway Dr., West Palm Beach,
FLA. 33406
LEARN CODE THE MODERN WAY ON 60 MIN. CASSETTES.
NOVICE 0-5 WPM PROGRESSIVE 5-13 WPM GENERAL
13-15 WPM, EXTRA 20 WPM \$3 each set of 4/\$10 FOB ROYAL
BOX 2174 SANDUSKY, OHIO 44870

SELL OR TRADE VHF GEAR, including TV transmitter
monitor receiver, reflex & zoom camera, color
cassette recorder, tape, SASE for list SHACK CLEAN-
UP. WAAPI, BOX 4095, Arlington, VA 22204

NEED SCHEMATIC for DAGE 60A tube type vidicon
camera. Also looking for older but good condition
line video monitor scope. Need not be in working
condition but must be physically OK. Also need
schematic for Blonder Tongue DVM17 video monitor.
Ron Yarborough WB4KGW 390 Springdale Circle,
Pensacola, FLA. 32503

AS GIVEN AWAY AT DAYTON: A BEAUTIFUL FACT FILLED GUIDE TO ATV FROM A TO Z. EDITED AND PUBLISHED BY
THE ATV PEOPLE, METROVISION P.O. BOX 408 FALLS CHURCH, VIRGINIA 22406. A COMPLETE AND AUTHORITATIVE
BOOKLET OF SOME 20 PAGES, WITH EVERYTHING YOU EVER WANTED TO KNOW ABOUT ATV. HOW TO START, HOW IT
WORKS, ATV REPEATER INFO, BLOCK DIAGRAMS, DEVELOPMENTS, TUNE UP CHARTS FOR RIGS, CAMERAS, AND A HOST
OF OTHER TOPICS ARE ALL COVERED. FREE FOR SASE. WRITE TO METROVISION C/O BRUCE BROWN WB4YTU AT
ADDRESS ABOVE. SEND LARGE 40¢ SASE FOR BOOK.

A5 HAS CONTACTED BLONDER TONGUE FOR A QUOTE ON BUILDING A SERIES OF SPECIAL UHF CONVERTERS FOR
ATV APPLICATIONS, WITH A LOW NOISE RF AMPLIFIER AND CHANNEL 3 OUTPUT SIMILAR TO THE BTX 111 UNIT.
TO GET AN IDEA HOW MANY WE COULD SELL TO HELP SUPPORT A5 WE NEED TO KNOW IF ANY OF OUR READERS, OR
MAKE AN ESTIMATE OF HOW MANY OF OUR READERS WOULD BE INTERESTED IN SUCH A UNIT. THE PRICE WOULD BE
IN THE \$39-\$44 RANGE. BEFORE WE COMMIT A5 FUNDS TO THIS PROJECT, WE NEED TO KNOW HOW MANY WE SHOULD
ORDER. B T WILL PREPARE A QUOTE FOR US BASED UPON THE TOTAL AMOUNT WE THINK WE CAN SELL.
IF YOU WOULD BE INTERESTED IN SUCH A UNIT, PLEASE DROP US A POST CARD LETTING US KNOW. IF WE DECIDE
TO GO AHEAD WITH THE PROJECT, WE WILL CONTACT YOU AND LET YOU KNOW THE PRICE AND HOW SOON THE UNIT
WOULD BE AVAILABLE. DO NOT SEND IN YOUR MONEY NOW. THIS IS IN THE PLANNING STAGE ONLY.

NEED AMPEX PARTS? HAVE MANY ITEMS ON HAND? WRITE " DOBS " C/O TPL ENGINEERING P.O. 109,
SMITHTOWN, NY 11717

NEED COMPLETE RCA COLOR BAR GEN, COLORPLEXER, BURST FLAG GEN, AND 3.58 OSC.BUFFER & AMPEX VR 7000 VTR
& TUBE VIDICON CAMERA FOR SALE OR TRADE?? WRITE E.A. SLIMAK W4KZL,P.O. BOX 12647, GAINESVILLE, FLA.
ZIP--32604

ANTENNAS AND THE LAW ----BY: Wade Williams W0BC

There are in some communities certain restrictions and ordinances and contractual requirements
that would deny the amateur radio operator the right to have an outside antenna.

There may be some justification of such restrictions as a safety measure but only a few communities
have defined what a "safe" structure would be. It would be reasonable that such antennas would conform
to specified engineering safety standards, but to arbitrarily deem the antenna "unsafe" is not
the province of any group or individual.

In lieu of safety requirements most of these restrictive acts simply seek to ban or severely limit
the use of outside antennas.

In effect these restrictions are based on the ambiguous theme that an antenna is somehow unsightly
and would lower the adjacent property values.

If this sounds familiar, it is. It is the same argument advanced to restrict the sale and occupancy
of property because of race or religion.

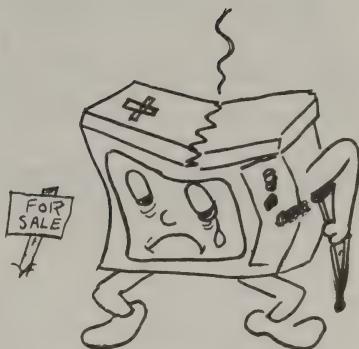
A radio amateur holds a radio station license that was obtained by written examination and by
meeting rigid requirements of character and technical competency. His station is licensed as a public
service. The service rendered by radio amateurs in war and emergency plus their contribution to the
development of the communications art requires no elaboration.

To deny a radio amateur the right to erect an antenna on his premises is to essentially deny him
the use of his station.

Satisfactory communications antennas cannot be concealed in a home or apartment.

To propose or condone such restrictions denies the full and normal use of private property and
imposes an untenable situation of the holder of an amateur radio station license.

The legality of such restrictions is questionable as they are an invasion of basic rights.



SUPPORT YOUR LOCAL HAM STORE

THE FOLLOWING HAM AND ELECTRONICS OUTLETS HAVE GRACIOUSLY TAKEN IT UPON THEMSELVES TO PROMOTE A5 MAGAZINE BY STOCKING EACH AND EVERY ISSUE AS IT COMES OFF THE PRESSES. IF YOU NEED AN EXTRA COPY FOR A FRIEND, OR KNOW OF SOMEONE WHO WOULD LIKE A COPY TO "CHECK" EM OUT YOU NEED ONLY DROP BY ONE OF THE FOLLOWING FINE ESTABLISHMENTS. TELL THEM A5 SENT YOU!!

Adams Appliance
18440 Joy Rd.
Detroit
Michigan 48228

Ft. Wayne Electronics
3606 Maumee Ave.
Ft. Wayne
Indiana 46803

Purchase Radio
327 E. Hoover St.
Ann Arbor
Michigan 48104

Henry Radio
11240 W. Olympic Blvd.
Los Angeles
Calif. 90064

Audioland
36633 S. Gratiot
Mt. Clemmons
Michigan 48043

Mayall Electric
124 Milton
Fall River
Mass. 02720

RSE
1203 W. I4 Mile Rd.
Clawson
Michigan 48017

Derrick Electronics
714 W. Kenosha
Box 457
Broken Arrow
Okla. 74012

Heathkit
18149 E. 8 Mile
E. Detroit
Michigan 48021

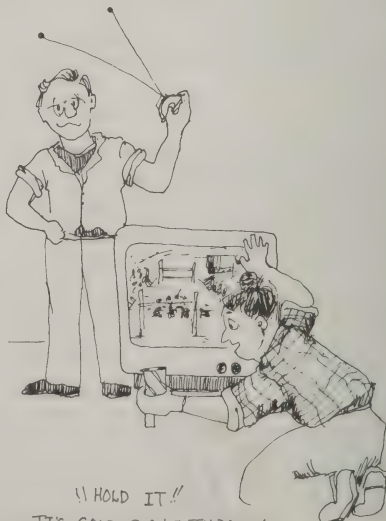
Spectronics
1009 Garfield
Oak Park
Ill. 60304

Amateur Radio Sales & Service
2187 E. Livingston Ave.
Columbus
Ohio 43215

Universal Service
114 N. Third St.
Columbus
Ohio 43215

Electronic Specialist
418 Baker
Lansing
Michigan 48910

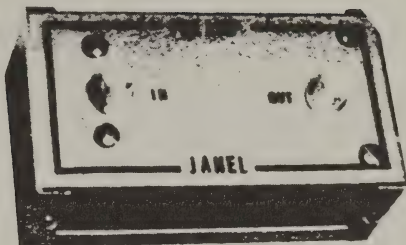
Graham Electronics
133 S. Pennsylvania St.
Indianapolis
Indiana 46204



440 MHz Preamps

model 432PA

only \$33.00



Two stage low noise bipolar preamp for DX, FM, ATV, and space work. Typically, 3.0 db NF., 20 db gain, 30 MHz bandwidth. 12 VDC, with a 1-5/8 x 4 x 2-1/8 inch aluminum case, BNC type connectors, postpaid and guaranteed - Model - 432PA only \$33.00. SUPER SENSITIVE model 432PC - As above but uses very low noise 2N5650 input stage, 1.5 to 2.0 db NF. - \$69.95

Preamps with all the above features plus AC power supply and 2-1/16 x 4-11/16 x 3-11/16 inch die cast cabinet:

Model 432PA-1 (3.5 db NF.) \$54.95 postpaid

Model 432PC-1 (1.5 to 2.0 db NF.)
\$94.95 postpaid

Specify center frequency (between 420 and 470 MHz)
New Jersey residents please add 5% sales tax.

Also Crystal controlled converters - Ideal for ATV. ask for the "ATV SHEETS". Full Catalog will be sent upon request.



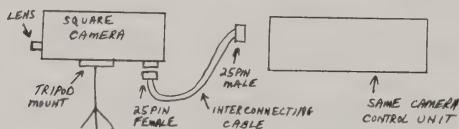
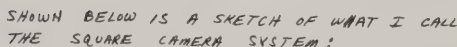
**JANEL
LABORATORIES**

P. O. BOX 112
SUCCASUNNA, NEW JERSEY 07876
Telephone 201-584-6521

Thomas P. Newhaus
WB2CLN
I89-19 45 Ave.
Flushing, New York II358

The remainder of this article is to familiarize you with the TV system, and provide trouble shooting info, and an interchangeability list of foreign parts for standard American EIA part numbers.

The figures below show the hook up of the two basic systems.



After purchasing a number of the cameras for their attractive price, I soon found that I had an immediate problem of finding the American equivalents for the foreign tube types. Many of them were not in any foreign/American tube substitution book. The following table will help you find the required tubes, with a minimum of labor. I suggest that you do not consult a substitution book, as every- one I consulted showed a replacement for the ECL-83 which would not work in the circuit at all. To save time and trouble, I suggest that you simply use the tube types I've listed on the chart on the following page.

EMI-FAIRBANKS (continued)

EL8I or 6CJ6.....6CJ6
EF-9I.....6AM6
I50C4.....0A2
GZ34.....5AR4

POWER SUPPLY TUBES

any diodes in the entire system may be changed to any replacement diode having 100V PIV or better ratings.

EI80F.....6688
interchange pins 6EJ7
8/9 on these 6EH7

CAPS

ECC8I.....I2AT7
EL84.....6BQ5

VIDEO AMPLIFIER

SQUARE HEAD: I3, I6, 25, 24, 20
ROUND HEAD: C3
INTERSTAGE AMP: C3, 5, I0, I4, I9, 23
VIDEO: C302, 306, 307, 3I0, 3II, 32,
3I9, 3I8, 320.
SYNC: CI06, I07, I2I
SCANNING: C202, 203, 204, 205, 207, 209
2I5, 2I6, 22I.
POWER SUPPLY: C 405, 406

ECC83.....I2AX7
ECC82.....I2AU7
ECC8I.....I2AT7
EL-84.....6BQ5
ECL83., NO AMERICAN SUBSTITUTE

SCANNING BOARD

ECC82.....I2AU7
EB9I.....6AL5
ECC8I.....I2AT7
6F33.....6AS6

SYNC

interchange pins 6/7. Break circuit foil to accomplish

I0667.....7038

standard vidicon

7035
E88CC/ECC88.....6922
6DJ8

Square camera head

ECF-80.....6BL8

change R34 from IOK to I2K

vidicon is the same as the square camera head

7077.....6CW4/6DS4

change RII to 82 and a 47 ohm resistor in parallel with the I8 ohm filament resistor. Remove the original tube socket and mount the nuvistor sideways. Connect the nuvistor pin for pin to connect the elements to their proper points in the circuit (pins used are not numerically the same in the conversion, and better performance is provided by using the nuvistor.)

TROUBLESHOOTING

I was faced with the problem of troubleshooting the entire system to work out any bugs which long storage had left behind. A friend who is a capacitor engineer informed me that the black capacitors used in the unit were of a poor quality, and a lot of time could be saved by just wholesale replacement of these before going any further. He was right, as better than 90% of the caps proved to be bad as removed from the circuit. The capacitor values were not critical and it was found that purchasing 37 of the .5 UFD caps at 600 volts was economically and time savingly practical. The total time to clip and check the caps in not worth the few you might save. Replace them all and leave the problems behind.

PURCHASING

It is imperative that no matter where you purchase the camera, get enough connectors and video cable to complete the system and above all, the operational manual. It is hard to find these connectors, and cable separately. One can purchase this camera from Denson Electronics, Box 85, Rockville, Conn. 06066, or from the author (address at head of article). Low cost tubes can be had from Edlie Electronics, 2700 Hemstead Turnpike, Levitown, L.I., NY, or Zalytron, P.O. Box 387, Mineola, LI, NY IISOI, Barry Electronics, 5I2 Broadway, NY, NY, or Cornell Tubes, 42I5 S. University Ave., San Diego, CA. 92I05, or from the author.

The available optional equipment is not really worth a lot, but if you can get a really good deal on it (like next to nothing) you might want to purchase some of the remote control or other optional equipment. The automatic light level control unit is of poor design. The motorized iris and focus motors are very cheaply made as the motor housing and most of the motor parts are made of plastic. The video switcher and remote control units work well, but take up a lot of space.

There are few cameras of this high of a quality presently available on the market, and with the growing activity on 439.25, there is no real excuse to not purchase one and join in the fun. Cost can certainly be no limiting factor now for obtaining a fine camera for your ATV station.

PRECISION FOCUSING AND ADJUSTMENT OF
SSTV EQUIPMENT

BY: Leonard M. Butsch, Jr. K4CNP

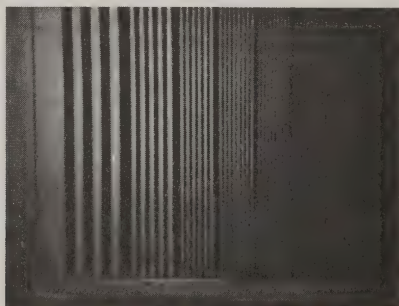
Precision focusing of slow scan TV cameras of the sampling type can be accomplished without the need for any special equipment such as a view finder or oscilloscope and gray scale tape combination. First consider some basic principles of physics as to how best to focus a camera. The depth of focus is shortest when the F setting of the lens is lowest. Most cameras have lenses that can be opened to F 2.7 or less. What is needed is a subject upon which to focus that permits focusing during the horizontal sweep of the sampling camera. Such a subject is a series of vertical lines, a good example being an optical burst chart on 8 1/2 by 11 inch paper. Such a chart can be readily obtained from ATV Research, Dakota City, Nebraska, or made with a minimum of time. The attached photo shows such a chart. It is best if the chart contains alternating black and white vertical lines starting at the left side of the chart with lines about 1/4 inch apart alternating black and white and in four or five groups have the vertical lines reduced in size to about one sixteenth inch or so.

Following in step form is one way to rapidly and precisely focus and set the light and dark adjustments for the camera to standards established.

1. Darken the room sufficiently so that the camera, when very roughly focused on the optical burst chart and with the lens all the way open (lowest F setting), shows no picture at all on the monitor.
2. Gradually raise the level of light until a picture begins to show on the screen of the monitor. This picture may be so blurred that only the level of light from the monitor is raised from black to a dark gray.
3. Slowly focus the lens of the camera until the sharpest picture of the vertical lines in obtained. It helps to raise the light level a bit to get a good picture on the monitor. If a graduated optical burst chart is used (from 1/4 inch to one sixteenth inch alternating black and white lines) watch for the finest focus by observing the smallest lines for sharp focus. SINCE THE LINES ARE VERTICAL THE CHANGE OF FOCUS CAN BE RAPIDLY VIEWED ON THE MONITOR SINCE EACH SWEEP OF THE HORIZONTAL SCAN WILL CHANGE WITH CHANGE OF THE FOCUS CONTROL.
4. Once the sharpest focus is thus obtained, return the F setting to a safe number for the level of lighting ordinarily used or better, to the maximum F setting of the lens.
5. Set up the picture to be transmitted and then reduce the F setting of the lens until the best contrast in the picture is obtained. This may require minor adjustments of the brightness and contrast (or target) controls also.
6. The picture is then set as best the camera can transmit it and since the F setting is in all probability higher than it's minimum level the depth of focus of the camera is greater, thus assuring a well focused picture.
7. If a gray scale tape is available it can be used to check the cameras swing from black to white with the assistance of an oscilloscope. If no such tape is available, black can be established by capping the lens of the camera and setting the monitor contrast control so that black just occurs on the horizontal sweep and then uncapping the camera and setting the brightness control so that the whitest image occurs when a glossy white piece of paper is held in front of the camera. Settings for black and white for the camera can be optimized by having a chart made up, half black and half white or perhaps better having four equally divided spaces of black and white on an 8 1/2 by 11 sheet of paper. With such a chart the camera can be adjusted for black and white with the black being just below the viewing threshold and white as bright as possible.

It is not the purpose of this article to serve as a final method for camera adjustment, but as a rather easy way for the SSTV ham to adjust his equipment rather precisely without the need for expensive or fancy electronic aids. I might add that from the many questions that I have received and from some of the pictures that I have seen that such a simple method may be of considerable help to many hams.

CONTINUED ON CHANNEL 27.....





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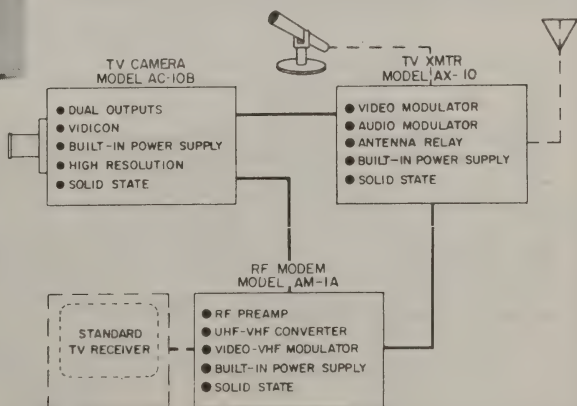
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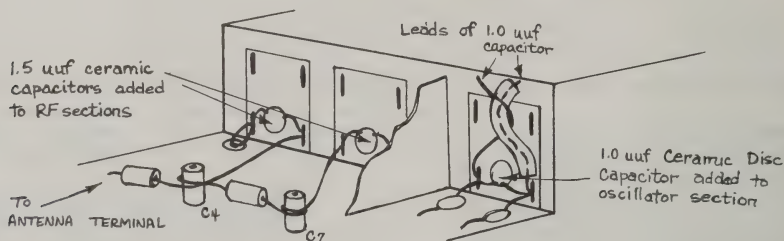


MODIFICATION OF MODEL BTG-99R, BTU-2R and BTU-2S CONVERTERS TO
COVER THE 420-450 MC AMATEUR TV BAND TO CHANNEL 5 OR 6

The normal tuning range of our home type UHF converters is 470-890 MC. It is therefore, hereby necessary to extend the low end tuning limit down to the required frequency. This may be done conveniently by the following procedure:

1. Add the I-5 uuf ceramic disc capacitors, using very short leads to the RF tuning sections as shown in-figure.
2. Untwist and remove length of transparent polyethelene sleeving on leads across oscillator section (To prevent melting off sleeving).
3. Clip off present leads across oscillator section and solder a I.0 uuf ceramic disc capacitor across oscillator section leaving both ends free (see figure)
4. Slip back the sleeving previously removed over one of the leads of the I.0 uuf capacitor.
5. Twist the leads of the capacitor together intil oscillator frequency is approximately 333 MC. (As determined with the aid of a grid dip meter), with the tuning knob all the way clockwise. Do not short leads to ground or to each other.
6. If necessary, readjust (by approximately equal amounts) the two RF ceramic trimmer capacitors (C4,C7) for maximum gain, leaving the TV receiver tuned to either channel 5 or 6.

The amateur TV band will then fall approximately between channels 14 and 21 on the tuning dial when the TV receiver is tuned to channels 5 or 6.



The normal tuning range of our home UHF Converters is 470-890 mc. It is therefore merely necessary to extend the low end tuning range and change the I.F. output frequency to allow conversion down to 20-30 mc. This may be done by the following procedure, taking care that no wires or parts other than those mentioned are disturbed.

1. Unplug unit, remove from cabinet and turn upside down.
2. Remove small shield cover from oscillator tube socket compartment by sliding it towards the front apron.
3. Note pair of twisted wires (C15) on tuner, within this compartment. Clip off twisted wires 1/2 inch from point of soldering to tuner.
4. Wind a coil out of #24 wire, 22 turns close-wound on a 7/64" drill. Use nylon or enamel coated insulated wire and tin leads of coil.
5. Solder coil having no more that 1/4" leads to ends of twisted wires. Take care not to disturb any other wires or components. Solder coil rapidly to prevent capacitors from becoming unsoldered.
6. Replace shield cover.
7. Near back of switch, note coil with 3 color winding. Solder a 120 PF disc ceramic capacitor from (counting leads inward from open end of chassis) leads 1 to 3. Turn unit right side up.
8. Note 2 brass hex slotted screws. Using screwdriver carefully screw them both down to chassis. (Do not tighten).
9. Unscrew each screw exactly 5-1/8 turns, being careful not to loosen mounting nuts.
10. Connect UHF antenna via tubular (or standard) 300 ohm twin lead to terminals marked "UHF ANT".
11. Connect communications type receiver to terminals marked "T.V. SET".
12. Turn converter on (switch to "UHF") and set tuning dial to lowest end (approx. Channel 14) against stop.
13. Tune receiver between 20-30 mc for signals between 450-460 mc. Do not change tuning of converter once set.
14. Touch up converter tuning dial and brass screws for maximum sensitivity end to enter 450-460 mc range at 20-30 mc on receiver.
15. Replace unit in cabinet.



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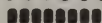
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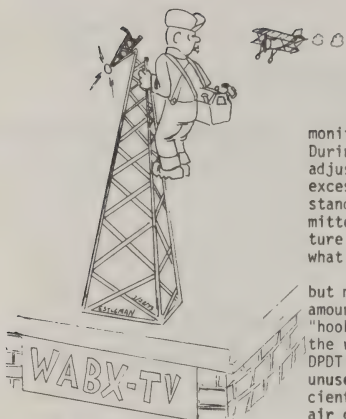


#3 8-PIN ROUND



#4 10-PIN ROUND





CENTRAL FLORIDA AVT

BY: R. Montgomery K4VFV

In the modifications or construction of camera, we found that a monitor, of the closed circuit type, proved to be an essential tool. During our early attempts to use on the air pictures, in order to make adjustments, we were always hampered with "picture overload" caused by excessive signal from the transmitter, much in the same way that your standard IF receiver overloads of blocks out when tuned to your own transmitter signal. This overload condition results in a badly distorted picture, causing mis-alignment in your camera, during the attempt to correct what you think is a problem.

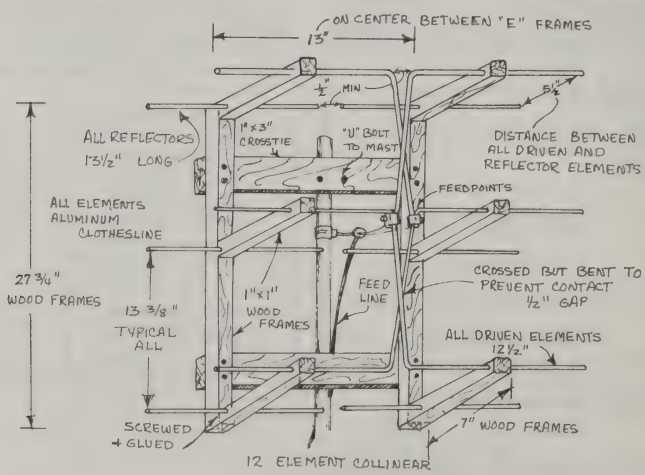
If no other monitor is available this on the air method can be used, but means of limiting the signal to the TV receiver must be found, the amount of distortion, if any, will vary with the many different types of "hook ups" that you may place into your operation, one solution may be the route that Dave Hall W4TOD-TV chose. Dave found that by placing a DPDT relay in his TV transmission line, leaving the normally open contacts unused, using the wipers and the normally closed contacts only, was sufficient. When his transmitter was keyed, this relay opens up, placing an air gap of several thousandths in the line, enough of the signal "leaks"

thru to give a good on the air monitor, when the transmission is complete, the relay will return to the normal closed position, giving the TV receiver normal receiving capabilities. To cope with your own peculiarities, several attempts, of placing this type of relay system in your line, may have to be made, to obtain satisfactory results.

Not having readily available funds handy to run out and purchase a jim-dandy commercial monitor, we were given an old Admiral portable, and this we were able to convert to a closed circuit TV monitor. The first step was to remove all connections to the tuner, strip the video IF circuits, and in the place of the IF strip, using the same tubes and in this case the printed circuit board, build a video amplifier circuit, this was straight forward, simple R-C network, and coupled to the video output tube, whose circuit was not disturbed, and be the old cut and dry method, we found a place where a half decent picture from the homebrew camera was obtained. I am still not completely satisfied with either the camera or monitor, and it takes time to solve all of the unknowns....Is the problem in the camera or in the monitor?...Who can tell, only time and tinkering...

The antennas for ATV are many and varied, we have used commercial UHF TV antennas, after some slight modifications to the driven element to make the frequency, but, it was found, thru experiments that these antennas altho usable, lacked the gain that was desirable.

Most of the stations operating within this area are using Collinear arrays, these arrays are fully shown and explained in ARRL's Handbook and VHF Manual, so we will not go into full details here, what we will show is one simple, inexpensive version of the array, consisting of two wooden "E" frames, with aluminum clothesline elements, purchase of all materials should not exceed \$2.50.



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To do this, Aquarian has published a newsletter for over five years and these have been compiled into a new book called UNPOPULAR SCIENCE (which is available from bookstores and from ARF for \$ 4.00). We have also published THE NATURAL BIRTH CONTROL BOOK which is becoming widely known in this country as well as in Dutch and Portuguese editions. (\$ 3 from ARF. Available at usual discount to stores).

(Continued on other side)



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Optional Accessories Standard lens (16 mm, f1.8);
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Camera Tube 3/8 inch (16.9 mm) separate mesh type vidicon
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PRECISION FOCUSING AND ADJUSTING OF SSTV EQUIPMENT (ADDENDUM)

BY: LEN BUTSCH K4CNP

My previous technical correspondence regarding focusing SSTV sampling cameras was prepared primarily for the amateur who has a minimum of test equipment. If an ordinary oscilloscope is available the focusing job becomes much easier, assuming that the SSTV camera or monitor has an auxiliary video output for scope. Such outputs are found on the W3EFG kit sold by Hal, Inc. and on the Robot 70A. Attaching an oscilloscope to the auxiliary video output permits the amateur to see an oscilloscope presentation of his sync pulse, his video, and his black and white limits. The black and white limits can be established by covering the lens of the camera for black and throwing the color reversal switch for white in those cameras having such a switch, or for those cameras not having the color reversal capability, placing a brightly lighted piece of white paper in front of the lens, and opening the iris until white limiting is obtained (the scope signal ceases to rise further vertically).

After attaching the scope and finding the sync pulse and black and white limits, place the optical multiburst chart in front of the camera lens at the same distance at which pictures will be taken. While observing the oscilloscope pattern and simultaneously changing the focus range of the lens the scope pattern will maximize at the exact focus. Remember that the iris is set at the lowest F setting and the room light is just sufficient to obtain a good pattern or gray image on the monitor. The reason for the scope pattern increasing to maximum at the same time that optimum focus is obtained is that the camera will be "seeing" the vertical black and white lines the sharpets at that time thus creating maximum swing in the scope.

Last, an elegant picture may be obtained with the aid of one more inexpensive item, a gray scale tape. This item is most valuable for several reasons. It is accurately calibrated so that the true values of the sync, black, white and intermediate frequencies will be portrayed on the oscilloscope when the tape is played through the monitor (or camera with proper input modifications). The gray scale tape levels can then be compared to the camera levels for sync (1200Hz), black (1500Hz) and white (2300Hz) and intermediate levels of gray. Be sure that the scope is in the D C mode of operation if possible or the sync frequency will not remain at the same position on the scope face but will "average" with the video and thus move, generally, up somewhat from the gray scale position.

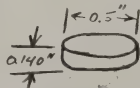
I have found that the above setup procedures result in the best picture that I can obtain from any of my camera, both homebrew and purchased.

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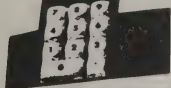
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MAY-JUNE

CHANNEL 27

A-5 MAGAZINE

CURRENT EVENTS

The Tu-Buro Radio Club W2BMW will award a special certificate free to anyone who works 5 club members. The following are active on ATV: W2JMU, W2LXC, WA2IUU, WA2MXB, WA2WAK, WB2KEK, WB2KHO, WB2OZA. Send applications to Tu-Buro Radio Club, 149-14, 14th Ave., Whitestone, NY 11357

Clayt VE3LU has commenced FSTV transmissions in the Brantford area and first reception reports are encouraging. Using a converted Motorola T-44 transmitter on 439.25, Clayt is being received 28 miles away, which is something of a Canadian record. Work is now going on to establish two way contact with the Hamilton-Burlington area. ATV activity is feverish as VE3EEL, FMY, FYY, EBF, CZN, AYR, GZM, CYC, and GHI ready their equipment for a spring onslaught on UHF.

May 2nd, saw VE3BBW demonstrate his I2 volt powered portable ATV stations with an output of 4 watts in Kingston, Ont.

Howard VE3RL reports three stations in the Bellebille, Ont. area ready to go FSTV. Ron VE3CAB, Bill VE3CUK and Howard are all awaiting good weather to put up a high gain array. Their equipment consists of RCA, Motorola and GE transmitters, with Canadian converters. Sony cameras are being used. The ops built their own video modulators using the W6ORG format. Everything is operational and soon viewers in the Quint area will have more to look at than the CBC.

VE3CDM Tom, and VE3FOV Dan gave a good demo and talk on ATV to a large audience at the Scarborough ARC, meeting on January 27st. They put ATV into perspective very well by reviewing the history of ATV as well.

Bill DeWitt W2DD of Fairport, NY does his SSTV viewing on a FSTV monitor. Scan conversion is via a Hughes Aircraft Co. MSC-I Scan converter which uses a storage tube. The photo at right shows the entire slow scan picture and how it is viewed in a steady form on a conventional TV set. For comparison purposes, a portion of the SSTV scan is shown on the SSTV monitor.



The Ontario Amateur, a publication of the Radio Society of Ontario Inc, is available for \$5 with a membership in the society. It is a comprehensive and well put together publication of particular interest to Ontario amateurs, but has a lot of information which is pertinent to hams of all areas. It includes sections of interest to all including AMSAT, ATV, SSTV, RTTY, DX and other facets of ham radio. Write to RSO Inc, P.O. Box 334, Toronto, Ontario, Canada M8Z5P7

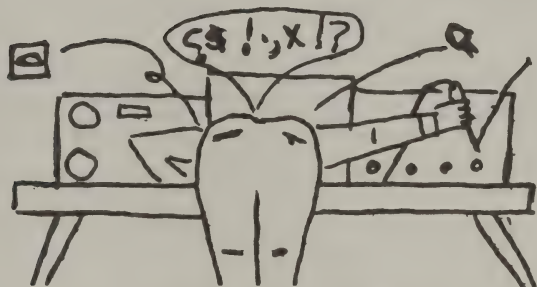
PHOENIX, ARIZONA ATV is active with WA7MAS and K7UOP, WA7RIQ. WA7MSK has designed a video modulator which is color capable, a 6 Mhz bandwidth, but is using a Motorola T-44 which restricts bandwidth somewhat. RIQ relates in a letter to A5 that this summer a solid state transmitter is in the building stage which will be color capable. RIQ is presently using a RCA PK-315 camera and IMC-800 1" VTR. He hopes to go full color before the end of the year! The group is looking for other interested hams who would have some proficiency in ATV system design, and any other information pertaining to ATV.

Baltimore has a group called the Maryland Amateur Television Society, and they are currently putting an ATV RPT together. Due to a local windstorm, area hams lost many large antennas arrays including W3IRL who lost about \$300 in ATV antennas alone. They all use horizontal polarization, which they say makes it rough to DX. WA3TJP reports that many stations are using both horizontal and vertical polarization.

Tom O'Hara W6ORG reports that tests by the government support the view that polarization is not a critical factor on 420 Mhz signals. But absorption by trees and other foliage is. Tom reports that in one instance, he was able to receive a snow free picture from a station 15 miles away in the winter, but was unable to receive a picture at all in the summer, through the trees! The other station was running a constant I2 w output. Tom also reports that the EARTH ground plane effect at 420 Mhz is not at ground level, but is actually much nearer the tree tops. So any antenna you have at 420 which is not above the trees is in effect not above the ground! This confirms what most of us already know, get the antenna in the air, the higher the better. INVERSION in S. CA. is also a major factor in ATV activity. Tom reports that the inversion acts as a good conductor/reflector for signals which are below 2500' MSL, and signals above this level, say from the mountain tops, are reflected into space. This permits long distance DX on 420, up to several hundred miles, with low MSL locations, even with intervening obstacles. This is similar to the "ducting" experienced on 2 meters in the summer time in the midwest, where entire states and adjacent states are in Q5 copy for a while permitting several hundred mile contacts on 2 meters. For those of your famillier with P.C. Electronics, you will be glad to know that the video ID'er is now in production, and a solid state TV transmitter is in the works. Tom will release data shortly on the new goodies.

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BY: Charles F. Milazzo WB2OZA

The filter has reduced the interference here to less than one microamp on the second limiter with hardly any degradation of ATV signals. It also worked well in the transmitter output, and when tuned to resonance an insertion loss of about 1 db was measured using a Bird wattmeter.



ATV VISUAL IDENTIFIER

BY: Al Lipkin W3AEH

One of the pet projects I never found time to build was an electronic character generator for providing call letters to superimpose on the ATV station video or use as a test pattern. Such an identifier is useful in quick break operations, such as net go arounds or TV repeater I.D. (the WR4AAG ATV repeater, identifies by keying up a character generator during the squelch period.) I had planned to use a simplified circuit, using several of the frequencies generated in my multiburst generator (see A5 Magazine Sept/Oct 1973).

This proved not to be practical and would limit construction only to those who have built the multiburst generator.

Several articles have been written using different approaches to the identifier. The various circuits, in my opinion, left something to be desired, either in quality or versatility. I never found the time to breadboard my own circuit design or layout the P.C. boards necessary to simplify construction of a complex circuit approximately 20 integrated circuits and semiconductor devices.

The September, 1974, issue of Radio Electronics Magazine provided an easy solution to the problems mentioned before, time and availability of p.c. boards. Don Lancaster has written an excellent article on a revideo device which takes the binary coded decimal output from an external digital clock and converts it to a TV signal for displaying the time digitally on the TV screen. The heart of the circuit is a signetics 2513 character generator I.C. The 2513 has 6 input address lines, which, when fed with the 6 bit ASCII code will generate any of 64 possible letters, numbers, punctuation, or blanks. To simplify the circuit for time (or numbers) use only a four bit or four address line ASCII code is all that is required; the remaining two address lines are kept in the high or logical "1" state. An etched and drilled circuit board is available from Southwest Technical Products, 219 West Rhapsody, San Antonio, Texas, 78216 (their No. RV-I for \$2.85, plus postage.)

I have built this revideo circuit, slightly modifying the circuit board and adding four additional integrated circuits to an auxiliary board to allow the generation of letters for ATV identification use. Once these modifications are made, a one line, eight character display, moveable anywhere on the TV screen, will be produced. The ASCII code to form the one line message is programmed by placing jumpers from the 2513 input address lines to either +5v or ground.

This basic circuit can later be expanded by replacing the jumpers with switches or memory circuits to add flexibility or increased message length.

See figure 1 for a block diagram of the identifier. The six 74151 I.C.'s are eight input multiplexers which act as a six pole, eight position switch connected to the six line character generator address input. Each position of the switch corresponds to one of the eight character spaces in the one line message. At each position the 2513 address lines must see a combination of logic states "0" or "1" corresponding to the ASCII code for the desired letter or number. For instance, the letter A is represented by ASCII code 000001 which means at the time the letter A is desired, five of the 74151 is at +5v. See the Radio Electronics Article for a detailed description of the circuit.

If you are not scared off by this time, I will now get into the modifications required and my experiences during construction.

Two rv-I boards were ordered. Upon receiving the two (duplicate) rv-I boards, a visual inspection revealed one to be poorly processed with foil spillover and several shorts. The other one proved perfect in this respect, however both required minor changes to the foil pattern to conform to the circuit. These were as follows:

1. At the 7410 (IC-14) break the foil to isolate pins 1 and 2 from ground, then wire a jumper from pins 1 and 2 to the +5v (pin 14)
2. At R8 (IK) break the foil to the ground end of RT (contrast pot), then wire a jumper from the same end of R8 to the end of R7 connected to the 7496-pin 10.
3. Wire a jumper from the 7405-Pin 1 to the junction of C13 (390 PF) and R32 (470 ohms).

Additionally several foil changes were required in the 74151 input lines to enable programming the alphanumeric message. These changes are as follows:

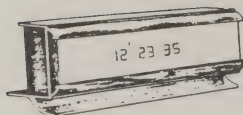
1. Break foil at IC-8 (2513) isolating pins 21 and 22 (separately) connect a jumper for +5v bus to pins 23, 24.
2. Break foil at IC-10 isolating (separately) pins 2 and 14.
3. Break foil at IC-11 isolating (separately) pins 2, 4, 14.
4. Break foil at IC-12 isolating (separately) pins 2, 4, 14.
5. Break foil at IC-13 isolating (separately) pins 1, 2, 4, 13, 14.
6. Jumper multiplexer input lines to +5v or ground as required to program the message (or I.D.) using ASCII code as a guide (see Radio-Electronics article).

Build up the auxiliary board circuit with two additional 74151 multiplexers and two 555 I.C.'s (H and V oscillators see figure 2).

Build the revideo board per the radio-Electronics article-with the following exceptions: There are numerous errors in the article relating to the parts list and values listed on the schematic. There are a couple of minor schematic errors (as compared with the actual circuit board wiring).

Some minor changes to the circuit were made to improve operation using TTL I.C. horizontal and vertical sync drive circuits. Also, sockets were used for all I.C.'s and transistors.

The changes and errors are listed on Channel 33,



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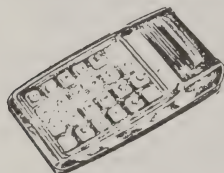
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ATV VISUAL IDENTIFIER (continued)

THE CHANGES ARE:

1. Where the parts list in the R/E article has left out items, use the values shown in the schematic.
2. R26 should be 2.2 K
3. C18 (.01) connected to pin 9 of the 7400 is incorrectly labeled c16 on the circuit board.
4. R29 (2.2K) connected to pin I3 of the 7400 is incorrectly labeled R40.
5. R14 should be 10K.
6. Add 2.2K between Pin 8 of 7405 and the +5v.
7. C7 and C14 replaced with jumpers to allow use of TTL compatible sync drive signals. D4 and D5 eliminated for the same reason.
8. A .001 capacitor was connected to the D5 eyelets to remove any horizontal pulses present causing jitter in the vertical circuit.
9. C11 changed to 470 PF to make characters wider.
10. Eliminate D3 if video output is fed into low voltage circuits. (5v or less).
11. Schematic errors (board wiring is correct) R12 and C6 are reversed in location. Jumpers from arms of R24 and R25 should be to the +5v side.
12. At IC7 (7493) install vertical size jumper in the 28 line position. If a larger size is wanted at a later time, a simple divide by two circuit, using a 7474, can be inserted between the jumper eyelets (remove Jumper!!) Locate the 7474 on the auxiliary board with the two 74151's and 555's. see figure 2.

If horizontal and vertical sync drive pulses are available (from your camera or sync generator), wire the input circuit per the schematic in the Radio-Electronic article. You then won't need the two 555 oscillator I.C.'s on the auxiliary board.

This type of video I.D. will become more popular with time and may eventually be used by most of the ATV stations.

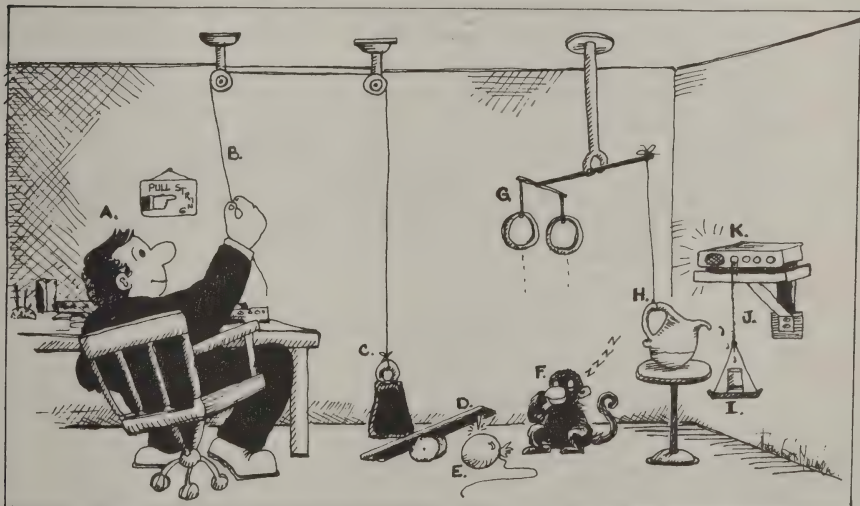
This was an interesting project to build, as much can be learned about current integrated circuit technology while getting the I.D. er operating, whether this particular circuit or one of the new kits becoming available is built.

If you want to learn more about integrated circuit character generators, you might read the Don Lancaster article in the June 1974 Radio-Electronics.

If you have any questions, suggestions or comments, etc., I would appreciate receiving them. Please send a SASE if a reply is wanted.

At Lipkin W3AEH, 8822 Fairfield St., Philadelphia, PA 19152

CONTINUED ON CHANNEL 38.....



MR. A. IS DIRECTED TO PULL STRING (B) LIFTING THE WEIGHT (C) WHICH LOWERS OTHER END OF PLATFORM WITH NAIL IN IT (D) CAUSING BALLOON (E) TO POP AND CUE MONKEY (F) TO JUMP UP AND REACH FOR RINGS (G) AND CAUSES OTHER END OF POLE TO TILT

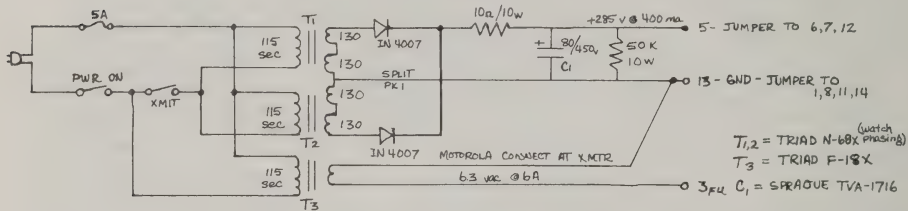
PITCHER (H) TO POUR WATER INTO GLASS (I). WEIGHT OF GLASS CAUSES STRING (J) TO TURN SWITCH ON RADIO (K) ON. NOW MR. A. CAN WORK EASILY AND KEEP INFORMED WITH HIS RADIO ON!

ATV TRANSMITTER CONVERSION

GENERAL: The RCA-CMU 15 or 15A is the easiest, cheapest, and the best FM transmitter to put on 435 MHz A5. Prices advertised in the various ham magazine range from 18 to 35 dollars. They are capable of putting out 15 watts of stable high resolution-up to 600 lines- video depending on the camera used. Commercial TV usually runs around 300 lines due to the restricted bandwidth. This conversion enables a 10 MHz BW. Any of the FM rigs that use a 5894, 6907, or 6939 dual tetrode can be converted similarly.

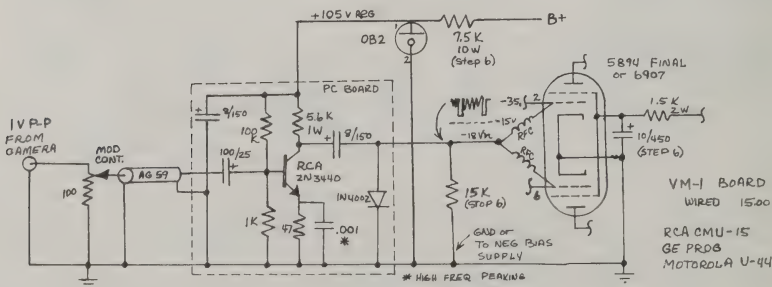
CONVERSION: 1. Disconnect the transmitter section from the rest of the transceiver. The power supply and receiver can be used for junk parts or put on one of the local FM voice channels.. It is unusable for video due to the narrow bandwidth--approximately 2 MHz at the 1st IF.

2. Construct and connect the power supply below to the terminal lugs on the bottom edge of the chassis. These were clipped during separation from the power supply. (step 1)



3. Plug in a I2.083 MHZ FT-243 crystal into the octal crystal socket pins 4 and 6. This can be the cheapest one you can get as a freq. tolerance of .05% is plenty for ATV. Remove the I2AX7 limiter tube. Disconnect the 1.5K 2W final screen dropping resistor and temporarily ground the final screen. Remove both ribbon leads going to both 5894 final and 2nd and X3 grids. Replace them with #14 solid copper wire 1/4 inch longer than the original ribbon leads. They may have to be adjusted during tune up for proper tuning range.
4. Turn on power and tune up the multiplier string, by adjusting the tuned circuits for maximum negative voltage monitored at the II pin test socket pins I thru 5. The final and 2nd X3 grid #14 wire inductor lengths may have to be adjusted if you cannot tune thru a peak. Change them in 1/8 inch increments. Pin 5 should read -15 volts or so tuned.
5. Reconnect the 1.5K screen resistor and remove the short. Turn on power and tune final for maximum output into a 50 ohm dummy load or max neg. voltage at pin 8 (-1v). Retune final grid and 2nd X3 grid and plate for max rf output.
6. Add a 7 pin min tube socket (0B2) to one of the unused holes for a 2nd xtal osc. Disconnect the two final grid RFC from the bias bypass cap and 56 k resistor and connect them to a 15K 1/2 watt resistor. Add a 10 mf/450Vdc cap from the final screen to ground. Keep all leads extremely short. Add the video modulator below. Mount the board on 1" standoffs above the 0B2 socket to enable a 2" lead from the modulation pot for approximately 2/3 rf power output from step 5. Have a distant station talk your picture in from there. Your own overloaded tv receiver will give a false indication.

```
test socket
  pin
I Ist X3
2 Ist X2
3 2nd X2
4 2nd X3
5 PA grid
6 PA Ip
7 PA B+
8 RF out
9 ptt
10 mic
11 gnd
```



2513N Character Generator	\$12.00	95H90 Pre-scaler Chip up to 250 mhz	\$14.50
1101 265 bit Stat.Mem.	\$ 3.00	1103 1024 bit Dynamic Memory	\$ 5.50
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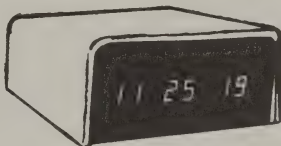
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Operate as 4 or 6 digit display, shows hours, min., seconds, builders option for 12 or 24 hr. clock.
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Features
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MOS/LSI. Segment & digit blanking
Segment & digit outputs can be (wire or D)
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6 pin...20¢ each,	10 for \$ 1.75
8 pin...25¢ each,	10 for \$ 2.00
14 pin...30¢ each,	10 for \$ 2.50
16 pin...35¢ each,	10 for \$ 3.00
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Write for list of 1 & 2 watt's available.

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100 mf @ 6 & 12 20¢ each,	10 for \$1.75
500 mf @ 16 v. 35¢ each,	10 for \$3.00
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3000 mf @ 20 v. \$ 1.00	5 for \$4.00

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1.5 muf, 3 muf, 20 muf, 27 muf, 30 muf, 47 muf, 51 muf,
56 muf, 62 muf, 150 muf, 200 muf, 220 muf, 390 muf, 1100 muf.

IN4004-400 piv @ 1 amp
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12 volt DC SIREN \$ 7.50
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ELECTRONIX

BOX 42
MADISON HEIGHTS, MICH.

MORE NEWS

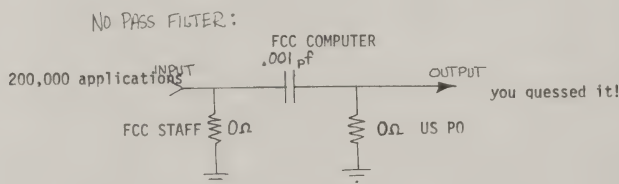
Several hams in the Dallas area are on ATV using 440.00 Mhz. WA5UNY and WB5MTW are just getting started. They are using the RCA E series transmitters and building converters and preamps.

Sunday, Jan. 14th, was a red letter day for ATV in Pensacola, Fla. Several hams flocked over to WB4KGW's QTH for a demo and talk on ATV. WA4JNU demonstrated his homebrew integrated circuit video synthesizer. The circuit included a Z axis modulator to flash the video ID. WB4KGW had his Motorola T-44 transceiver in operation for open circuit video at his QTH. (Gregory usually has these for about \$25) Using the T-44 as a driver, it is reported that WA3AXV puts in a good signal from 120 miles away. WB4CZP and WA4BMW are presently constructing their stations. Interested ATV'ers in Florida might give WB4KGW a call at 477-3897, or check in to the 6 meter net on Sundays at 8 PM LT.

OTHER PUBLICATIONS ON ATV: ATV Experimenter Anthology from 73 Magazine \$3
ATV INTERNATIONAL Park Ten Hove 97, Melle, Belgium (in English)
BRITISH ATV CLUB CQ-TV 93 Fleetside, W. Molesay, Surry, England KT80NQ
S. CA. NEWSLETTER, 215 S. Dexter, LaBabra, CA 90631 \$2 and 12 SASE's
THE VHF RAGCHEWER 390 Springdale, Pensacola, Fla. 32503

DO YOU HAVE A LICENSE APPLICATION ON FILE WITH THE FCC, AND YOU SAY YOU HAVEN'T HEARD ANYTHING IN MONTHS? You might like to know that as of May 8th, the FCC was 120 days behind in just opening the mail! Add to this the normal 6-9 weeks of processing, and you have a grand total of 160 working days, or better than 8 months delay in license applications. The problem is in the more than 200,000 new CB license applications just received, and the hundred thousand or so more new ones coming in each month. Then there is the confusion caused by the multitude who sent in too much money, which causes the application to be sent back to the applicant for refilling with the correct amount, and the hundreds which weren't filled in properly, and you can see that your license application had better be sent in a year before you really want it back! The FCC is severely understaffed to handle the onslaught, so your co-operation is needed. If you have a license renewal coming up, please do not delay in sending it in. Otherwise, you might just out distance the grace period before you get it back!

Operating portable or mobile? THE RULES STATE: WHENEVER YOU ARE OPERATING MOBILE, YOU MUST IDENTIFY WITH THE SUFFIX mobile/zone ie WB8HEE/M8. If you are working PORTABLE, at a fixed location other than your own or that of another licensee, you sign PORTABLE/ZONE ie WB8HEE/P8. If you are working from another ham's station, you sign HIS call, and enter your call in his LOG book. Most regular logging requirements have been deleted, but a few important entries are still needed. If in doubt write it down. Consult your local FCC office for questions you can't answer by reading part 97.



1979 WARC PREPARATIONS

WASHINGTON, MAY 8TH 1975 AND A5 WAS THERE. On a bright and hot, sunny spring day, some 30 amateur radio operators appeared in an FCC conference room at 2025 M Street in Washington, D. C. to form a committee under the direction of Prose Walker, to form several frequency task forces, whose job it is to provide the FCC with the information it needs to prepare a frequency allocation plan for retaining the expanding frequencies available for use by the various services, including ham radio. Among the many notables present were some active hams of VHF knowledge. This included Dick McKay of the Palasades Amateur Radio Club, Joe Schroder and Skip Tenny of Ham Radio Magazine, and yours truly, for A5. Eight task forces were set up to consider the various aspects of the needs of amateur to the year 2000. Robert Haviland is the chairman of the 27-1296 task force. The other chairman and other attendees names and addresses will be in the next issue of A5. It is important that you supply these individuals with pertinent information as to what our needs in the various frequencies will be, everything considered so when the WARC meets in 1979, the US will have a position paper which has JUSTIFICATION, REQUIREMENTS, BASIS AND PURPOSE of amateur radio. Ham frequencies are generally on a low priority, about two levels above the dog catcher, who might have priority in some area. It is necessary that we provide a sales program to other countries on the good and benefits of ham radio so that when it comes time to divvy up the spectrum, we can get our fair share. It is necessary to convince many countries to at least be positively biased, if not outright in favor of HAM radio for us to retain and expand our frequency list for all users. Several goals have been set including new HF bands, exclusive use of presently shared bands, expansion of present bands, and incorporation of space frequencies. If you have liaison with a foreign govt., it is important that you exploit this

WARC 79

to the best interests of HAMS. It is important to point out how HAM radio can help their development and/or economic growth, or technical base, and any other benefit you can think of. You need to justify the need for the spectrum space we want. We are competing with every other radio service and with political governments which are HOSTILE to ham radio, who feel it has no place in the spectrum or used for subversive purposes, or is in other ways dangerous to their national policy. The fight will be as much political as it is logical, and based on need and desires. We have a few countries who are in favor of ham radio, and we need to convince many more that ham radio is a good and viable means of growth, stability and goodwill. Put your talents to work. Send your comments to the WARC task force which would be able to use them best. SEND A5, QST, HAM RADIO magazine a copy so that when we prepare our comments, we have CONCRETE data to present as to why we need additional space or why we deserve to keep what we have. This has to be done by September, so get to it! The time is short before the FCC must prepare a position paper to present to the state department, who will present it to the WARC in 1979. There are many other aspects of this which will have to be ironed out before the final allocations can be worked out.

THE BLOCK DIAGRAM BELOW WILL HELP YOU UNDERSTAND WHAT IS GOING ON

H. Fine
Chairman
Office of Chief Engineer

A. Van Doorn
Safety & Special Radio
Services Bureau

N. McNaughton
Broadcast Bureau

R. Crowell
Common Carrier Bureau

J. McKinney
Field Operations Bureau

A. Rutkowski
Cable Television Bureau

W. Hartenberger
Office of Plans & Policy

J. Marino
Office of General Counsel

W. Torak
Office of Chief Engineer
Chairman: Registration Committee

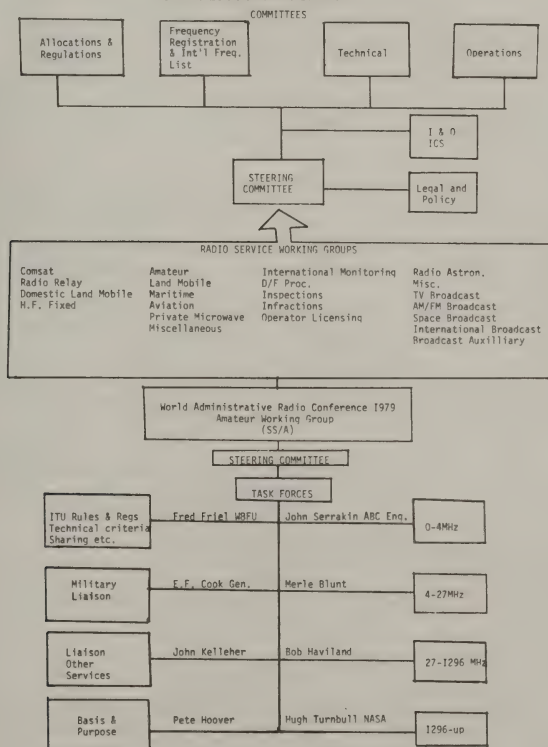
J. Robinson
Office of Chief Engineer
Chairman: Operations Committee

F. Williams
Office of Chief Engineer
Chairman: Technical Committee

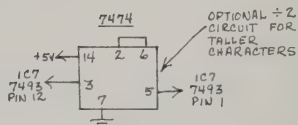
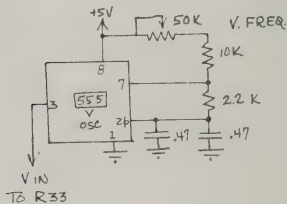
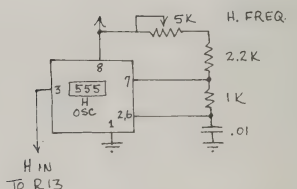
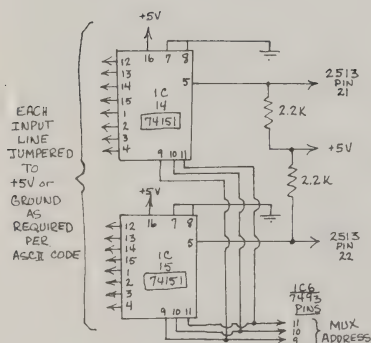
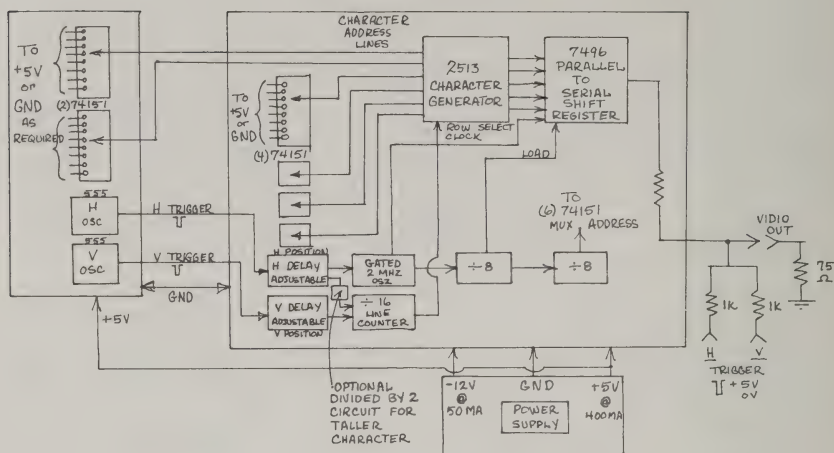
R.L. Cutts
Office of Chief Engineer
Chairman: Allocations Committee

U. Guthery
Office of Chief Engineer
Chairman: Legal & Policy Committee

INTERNAL ORGANIZATION



CHARACTER GENERATOR



CONTINUED ON CHANNEL 41.....

CONSTRUCTING AN INEXPENSIVE WEATHER SATELLITE PHOTOGRAPH RECEIVING STATION

A station set-up consists of the following: (1) a crossed yard antennae (2) a receiver pre-amplifier (3) an FM receiver for 136.5 Mhz and 137.62 Mhz (4) a printer, (Western Union Desk Fax with a black to white inverter). Each unit will be further described and additional reference material listed.

Satellites transmitting pictures are: ESSA-8, (operating on 137.62 Mhz), ATS-I, (135.6 Mhz), and STS-3, (operating on 135.6 Mhz). ESSA-8 is an orbital satellite with a period of 114.7 minutes, moving north to south. Pictures 800 lines at 240 RPM, alternates 2400 Hz tone for 140 sec. and picture for 200 sec, and is the same for all three satellite transmissions. ATS-I is geo-stationary, positioned over the equator at 149° East, sending weather maps of the Pacific on 135.6 Mhz at 0130-0215 CMT and 1400-1445 CMT daily. STX-3 geo-stationary is positioned over the equator at 69° West and transmits weather maps on 135.6 Mhz at transmitted on a 2400 Hz tone that is amplitude modulated. The signal from the satellite is FM modulated, therefore an FM receiver must be used to detect the 2400 Hz zone.

Antennae: (Note, a satisfactory unit may be built from scrap)

A 10 ft. piece of 1/2" conduit may be used for the boom, along with a broadcast FM antennae (Kay-town-model no. FMND/ISAG), used as the driven element. The length of the folded element is reduced from 57 to 44 inches! The folded elements are removed from the short boom and mounted on the 1/2" conduit along with 18 other pieces of 1/4" aluminum tubing salvaged from old TV antennas. The crossed yagi is a vertical and horizontal beam mounted on the same boom. The boom is strapped to a wooden tripod and is hand operated from the ground for orientation, to track ESSA-8. For ATS-I and 3 the antennae is printed at the stationary satellite. A speaker on an extension cord is used to listen for the signal. A harness is connected to the folded elements constructed of 300 ohm TV lead in. A new antennae may be purchased from CUSHCRAFT, 621 Hayward St., Manchester, NH 03103.

Receiver and pre-amps: (receiver pre-amp consists of 2 FET's as per diagram)

The receiver can be any conventional FM unit, 150-174 Mhz or 30-50 Mhz, and can be adapted to receive the satellite frequency by using a converter ahead of the receiver. I used a crystal controlled 88-108 Mhz FM multiplex receiver (not stereo) by removing turns from the RF coils. The receiver must have a sensitivity of .5 micro-volts or better after conversion. No special audio circuits are needed in the receiver, however, a tone control may be added. Picture quality may be improved by lowering the high frequency response of the receiver. I do not recommend trying to use a tunable receiver such as the type used to pick up police etc. A new receiver may be purchased from ROBYN INTERNATIONAL, INC., 269 Northland Dr., P.O. Box 478, Rockford, Michigan 49341, phone (616) 866-1589.

Note: 1. ATS-I and 3 pictures have several lines of sync, start scan mode when picture content starts.
Note: 2. ESSA-8 pictures have 30% overlap, copy the three pictures (three pictures may be copied on each pass) then match and cut with scissors to make larger picture, use scotch tape to secure.

Printer:

A used Western Union Desk Fax, MODEL 6500 makes an excellent one, and requires the following conversions: (a) the fiber drive wheel is replaced with a Boston gear #Q1324 and the gear will have to be machined out to fit the shaft. Also, the drive motor will have to be moved up to meet the smaller gear, (b) the "scan relay" located on the back left corner will need an SPST switch installed across the normally open contacts to start the scan mode when the satellite begins sending a picture. A printer and necessary paper may be purchased from VAN'S W2DLT ELECTRONICS, 302Z Passaic Ave., Stirling, N.J. 07980.

The picture is transmitted with white being the highest level of tone and black the lowest. To convert the picture so that clouds appear white, a black to white inverter must be used. Western Union model 7574A may be used or one can be built as per diagram.

Tracking ESSA-8 is best accomplished by pointing the antennae north-east on the horizon and waiting for the satellite to come within range. The schedule is quite complicated, however, the satellite will pass within range of you three times daily. Voice transmissions are made through ATS-I almost daily from 1 P.M. CDT until 10 P.M. CDT. These may be used for antennae adjustments, and receiver alignment.

References:

1. converter-preamplifier: THE RADIO AMATEUR'S HANDBOOK
pages 304 to 310, 1973 Edition.
2. Western Union Desk Fax: THE RADIO AMATEUR'S HANDBOOK
1973 Edition, pages 471-473.
(conversions in the book do not apply to this project.)
3. Boston gear #Q1324: Contact local machine shop or write Boston Gear, 14 Hayward,
Quincy, Mass. 02171
4. used receiver strips (30-50 or 150-174 Mhz) These may be purchased from:

GREGORY ELECTRONICS
249 RT 46
SADDLE BROOK, N.J. 07652

COMMUNICATIONS SERVICE INC.
P.O. BOX 10373
1601 DRAGON ---DALLAS 7, TEXAS

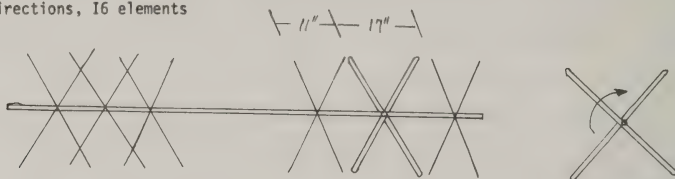
CONTINUED.....

CONSTRUCTING AN INEXPENSIVE WEATHER SATELLITE PHOTOGRAPH RECEIVING STATION (continued)

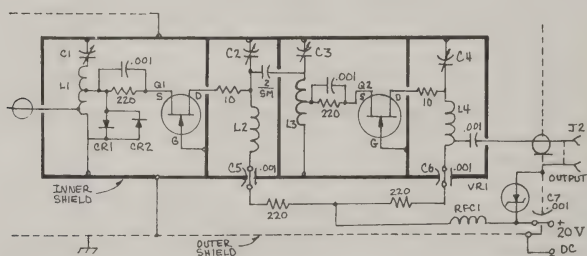
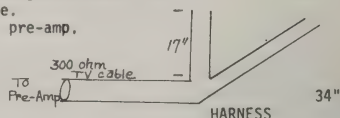
- Note 1. If you are a radio amateur you will probably have most of the equipment and technical ability to complete this project, if not, perhaps you may find one to assist and advise.
- Note 2. Sync and phasing of picture with printer, can be accomplished by dividing the 2400 hz tone by 40 and using the 60 hz with a 50 watt pa, public address amplifier to run the printer motor. However, a pair of scissors and scotch tape was found to be the least expensive.
- Note 3. 4 KHz tone was used to print with the converter because beats were present with lower frequency.

Use 8 directions, 16 elements

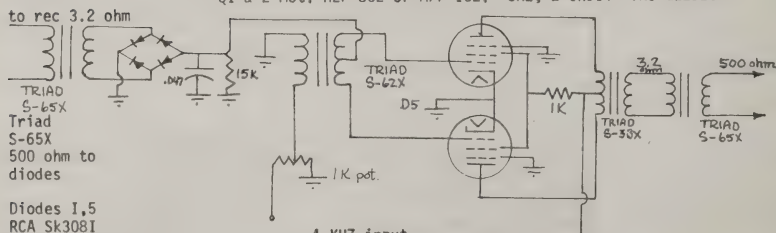
FRONT-



1. All directors 38.9 inches, all director spacing 11 inches.
2. Two reflectors 43.2 inches, spacing 17 inches.
3. Ant. must rotate around boom axis as well as pivot for tracking of ESSA-8.
4. Ant. can be mounted at rear and counter weighted for balance.
5. 300 ohm to 75 ohm transformer tv type used to match line to pre-amp.



Coils. 4 turns no. 14 tinned bus wire 1/2 inch dia.
3/4 inch long. Input and output tap 1/2 turn from bottom of coil, source taps 2 turns from bottom.
C1, 2, 3, 4, 18, to 25 pf air variable.
Q1 & 2 Mot. HEP 802 or MPF 102, CRL 2 In914 VRI GEZD20



Diodes I,5
RCA 5k3081

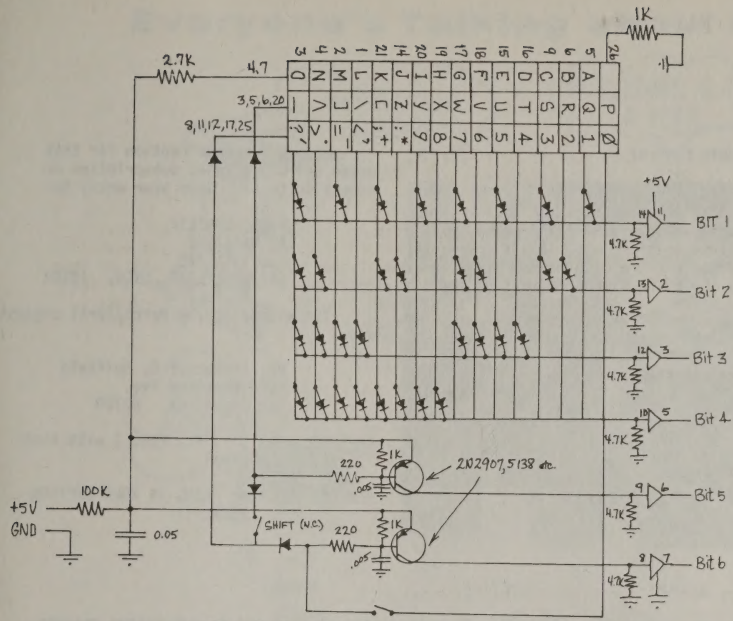
RCA
KC4002
Kit

CI-.005
C2&3 .005

- 4 KHZ input
any audio osc. may be used.
1. Adjust 4 KHZ input to print black.
 2. Adjust receiver volume control to reduce black level, while receiving sat. trial and error for proper picture contrast.

BLACK TO WHITE CONVERTER

CONTINUED ON CHANNEL 42.....



CHARACTER GENERATOR MATRIX

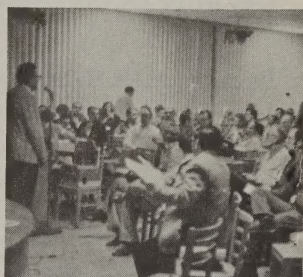
DAYTON ! ! ! ! !



"YOU WANT A 1000 WATT MOBILE AMP?"



"DENTRON'S HAVE MORE FUN"



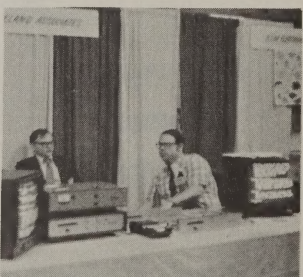
"ATV FORUM"



"FLEAS"



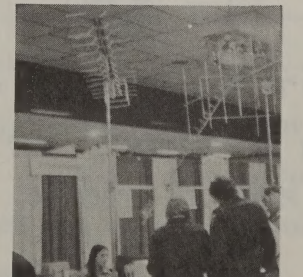
"A5!"



"VIDITYPE"



"SEEC SSTV"



"SPECTRUM INTERNATIONAL"



"ATV BY APRON"

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Pick a humorous caption for this photo and win a years subscription or extension to A5. Send your entry to:

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A5 MAGAZINE
P.O. BOX 128
WHITMORE LAKE, MICH. 48189

The winner of the March/April contest was:

Mr. Frederick G. Suffield
5875 Overlake Ave.
San Diego, CA. 92120

CAPTION: Yes Sir, Mr. FCC, I watt into the final.

YOU CAN WIN TOO! SEND IN YOUR CAPTION TODAY!!!

REWARD

WANTED!!!

REWARD

A5 needs your articles on FSTV, SSTV, FAX, RTTY, & other topics of interest to our active readers. How to do it, modifications, theory, build it, fix it.....WHATEVER!!! Jot it down and send your ideas in now. Our expert illustrator, Thelma will make your diagrams and schematics look professional. Every article published entitles the author to a FREE ONE Year subscription or extension to A5.

.....AND.....

The Authors of the BEST articles published will win the following:

- 1st. PRIZE.....ATV RESEARCH VIDICON CAMERA COMPLETE.
- 2nd PRIZE.....VHF COMMUNICATIONS 8 over 8 BEAM
- 3rd PRIZE.....CORDLESS SOLDERING IRON
- 4th PRIZE.....LARSEN 2 MTR, 1/4 Y MAGNET MOUNT ANTENNA
- 5th PRIZE.....LARGE COLLECTION OF PRIME IC'S

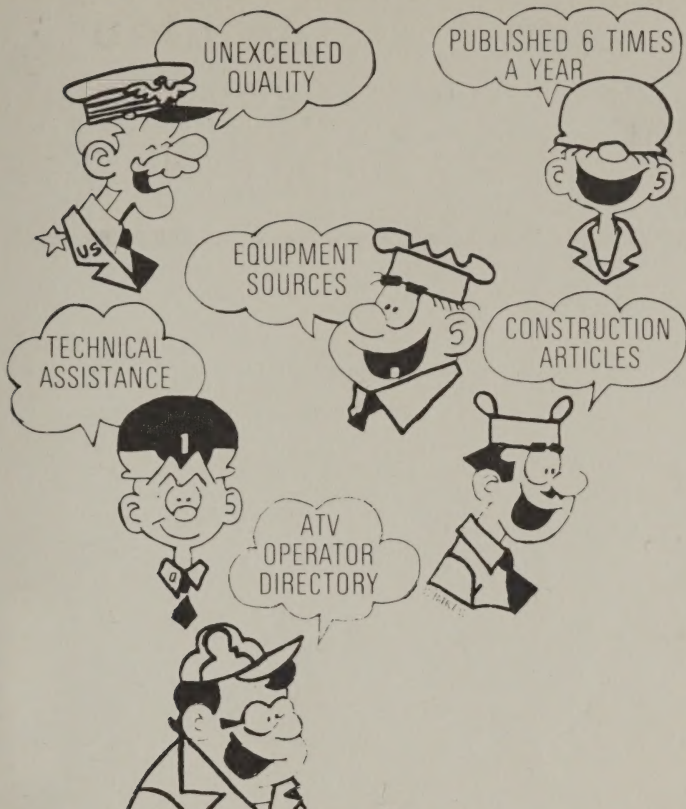
Contest ends December 1, 1975. All entries become the property of A5 Magazine, who will be sole judge of contest. Staff and family of A5 are not eligible to win. Advertisers and their families are not eligible to win. Void where prohibited by law.

Winners will be announced in November/December issue and prizes sent to arrive in time for Christmas.



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A-5 MAGAZINE

MARCH-APRIL 1975

CHANNEL 55 43

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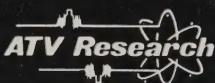
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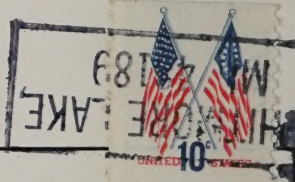
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